STATE OF INDIANA

INDIANA UTILITY REGULATORY COMMISSION

PETITION OF SOUTHERN INDIANA GAS AND ELECTRIC COMPANY d/b/a VECTREN ENERGY DELIVERY OF INDIANA, INC. ("VECTREN SOUTH-GAS") FOR (1) AUTHORITY TO INCREASE ITS RATES AND CHARGES FOR GAS UTILITY SERVICE; (2) APPROVAL OF NEW SCHEDULES OF RATES AND CHARGES APPLICABLE THERETO; (3) AUTHORITY, TO THE EXTENT NECESSARY AS AN ALTERNATIVE REGULATORY PLAN, TO RECOVER ITS UNACCOUNTED FOR GAS COSTS AND THE GAS COST COMPONENT OF ITS BAD DEBT EXPENSE IN ITS GAS COST ADJUSTMENT FILINGS; (4) APPROVAL OF A DISTRIBUTION REPLACEMENT ADJUSTMENT TO RECOVER THE COSTS OF A PROGRAM FOR THE ACCELERATED REPLACEMENT OF CAST IRON MAINS AND BARE STEEL MAINS AND SERVICE LINES; (5) APPROVAL OF THE IMPLEMENTATION OF THE SALES RECONCILIATION COMPONENT OF THE ENERGY EFFICIENCY RIDER PROPOSED IN CAUSE NOS. 42943 AND 43046 OR OTHER RATE DESIGN CHANGES THAT UNLINK ITS FIXED COST RECOVERY FROM ITS SALES VOLUME; (6) APPROVAL AS AN ALTERNATIVE REGULATORY PLAN PURSUANT TO IND. CODE § 8-1-2.5-6 OF A RETURN ON EQUITY TEST TO BE USED IN LIEU OF THE STATUTORY NET OPERATING INCOME TEST IN ITS GAS COST ADJUSTMENT PROCEEDINGS; (7) AUTHORITY PURSUANT TO 170 IAC 5-1-27(F) FOR A NON-GAS COST REVENUE TEST TO DETERMINE WHEN DEPOSITS ARE REQUIRED FOR FACILITIES EXTENSIONS; AND (8) APPROVAL OF VARIOUS CHANGES TO ITS TARIFF FOR GAS SERVICE, INCLUDING INCREASES IN CERTAIN NON-RECURRING CHARGES.



CAUSE NO. 43112

**Prepared Direct Testimony and Exhibits**
**of**
**SOUTHERN INDIANA GAS AND ELECTRIC COMPANY**
**D/B/A VECTREN ENERGY DELIVERY OF INDIANA, INC.**
**(VECTREN SOUTH – GAS)**

**Book 2 of 3**

**WS Doty, JM Francis, JP Kelly, RB Keeping**

**September 1, 2006**

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**SOUTHERN INDIANA GAS AND ELECTRIC COMPANY**
**d/b/a VECTREN ENERGY DELIVERY OF INDIANA, INC.**
**(VECTREN SOUTH – GAS)**

**IURC CAUSE NO.** 43112

# DIRECT TESTIMONY
# OF
# WILLIAM S. DOTY
# PRESIDENT

**ON**

**AGING WORKFORCE**
**GAS EMPLOYEE TRAINING, SAFETY, AND EMERGENCY PREPAREDNESS**
**ASSET MANAGEMENT TRANSFORMATION**
**GAS MAINTENANCE PROGRAMS**
**CUSTOMER CONTACT CENTER**
**REVENUE ASSURANCE AND**
**UTILITY PLANT IN SERVICE**

**SPONSORING PETITIONER'S EXHIBITS WSD 1 THROUGH WSD 5**

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## I.
## INTRODUCTION

**Q. Please state your name, business address, and occupation.**

A. My name is William S. Doty. My business address is One Vectren Square, Evansville, Indiana 47708. I am the President of Southern Indiana Gas and Electric Company, Inc. d/b/a Vectren Energy Delivery of Indiana, Inc. ("Vectren South"). I also am the Executive Vice President of Utility Operations for Vectren Corporation ("Vectren"), which is Vectren South's ultimate corporate parent.

**Q. What are your duties in your present position?**

A. As President, I have overall responsibility for the operation of Vectren South facilities and the provision of utility service for our customers.

**Q. How long have you been employed by Vectren South?**

A. I have been employed by Vectren South since the March 31, 2000 merger of Indiana Energy, Inc. and SIGCORP, Inc. into Vectren. My career in the utility industry began in 1993 with Southern Indiana Gas and Electric Company ("SIGECO" or "Vectren South"), which was the principal subsidiary of SIGCORP, Inc. prior to the Vectren merger. Since that time, and prior to my current role, I held a variety of positions including Director of Gas Operations, Vice President of Energy Delivery, and Senior Vice President of Customer Relationship Management. Prior to joining SIGECO, I was employed for 16 years with ALCOA and 2 years with Ford Motor Company. At those companies, I had various responsibilities in operations management, maintenance, engineering, and product development.

**Q. What is your educational background?**

A. I received a Bachelor of Science degree in mechanical engineering from Rensselaer Polytechnic Institute in 1972 and a master's degree in civil engineering and urban planning from the University of Michigan in 1976. I am a registered professional engineer in Pennsylvania.

**Q. Have you previously testified before this commission?**

A. Yes. In Cause Nos. 42027/42032 I provided testimony regarding Vectren South's proposed transfer of operational control of its electric transmission facilities to the Midwest Independent System Operator. I also provided testimony in Vectren North's rate case (Cause No. 42598) regarding plant in service and certain operational issues. Vectren North is also a subsidiary of Vectren Corporation.

**Q. What is the purpose of your testimony?**

A. I discuss various areas of Vectren South-Gas' distribution operations and explain certain maintenance and other activities which are needed in order to continue to meet the needs of our customers. In particular, my testimony will describe the challenges Vectren South-Gas faces as the highly qualified and experienced baby boom segment of our work force all reach retirement age within a brief span of time and begin to leave our company. I describe our proactive efforts for dealing with this aging workforce phenomenon and the resulting costs. I discuss additional expenditures for gas training programs. I also describe the Company's start of a multi-year effort to contain costs through our Asset Management Transformation program. I describe a number of maintenance programs to improve the condition and operation of our facilities, including our pipeline right of way clearance program. I describe our Customer Contact Center operations, discuss the fact that high energy costs have caused an increased volume of customer contact, and explain the fact that we have either hired, or contracted for, additional call takers to maintain satisfactory customer service. I also describe other increased operating costs, including meter reading and the increased staffing levels in our customer billing area which are needed to better serve our customers. I describe Vectren South Gas' utility plant in service and the change to utility plant in service since the last rate case.

## II.

## VECTREN SOUTH'S AGING WORKFORCE

**Q. Does Vectren South have any significant changes occurring in its workforce?**

A. Yes. Nationally, as baby boomers reach retirement age, a large number of long time skilled and experienced employees are preparing to retire over the next fifteen years. This is reflective of a generally aging workforce. The sheer magnitude of the anticipated retirements has drawn great attention to the issue and as a result, a heightened level of human resource planning has commenced as companies are focusing on their recruiting and training programs to assure that business productivity will not suffer. Vectren South is keenly aware of this potentially critical business problem, and has engaged in a planning process, inclusive of senior management, to enable the Company to address the issue before it threatens the reliability of the service we provide to our customers.

**Q. Have you personally been involved in this planning effort?**

A. Yes. I am the executive sponsor of a team consisting of operations and human resources personnel who have devoted significant time to setting out the dimensions of the problem as it pertains directly to Vectren, and have made recommendations to management on how to timely respond to the aging of our workforce.

**Q. Does the utility industry face the same dilemma as its counterparts in other industries?**

A. Yes. According to Bureau of Labor statistics, over 30% of the existing utility workforce will be eligible for retirement over the next 5 years, and by 2012 there may be 10,000 more utility jobs than available workers. A number of such studies indicate that the looming percentage of retirements in the utility industry makes the issue even more acute than in other industries.

As Vectren South has approached this issue, it has collected and referred to a great deal of data being reviewed by the industry. A recent article, entitled,

"Brain Drain: Our Graying Utilities," cited data that "the median age for workers in the utility sector (including telecom) is 3.3 years higher than the national average, with nearly half of the utility workforce currently over the age of 45." Energybiz Magazine November/December 2004, by Arthur O'Donnell. Some are referring to this situation as a "demographic time bomb," and Dominion Resources has labeled the phenomenon "The Wave" as it braces to face the fact that 45% of its workers will be eligible to retire by 2012. (Id.) Another study found that the average age of the workforce in power plants is 48 years. (Krishnan & Associates).

Exacerbating the situation is the time line involved in training new replacement employees. A PEPCO IBEW employee explained this constraint as follows: "From hiring to journeyman's level, it's a minimum of five years. To get to lead level, it takes 10 years." (Id.).

The American Public Power Association (APPA) surveyed its members and produced a report on the aging workforce defining this as the "new challenge to its members." The findings were that half the companies project the potential loss of somewhere between 21-50% of their workforce over the next five years. The companies indicated that knowledge loss would be the single greatest problem resulting from the retirements, with finding replacements also a great challenge. The APPA outlined steps for its members to take to address the retirement onslaught, including identifying gaps in terms of ongoing productivity needs and investing in training resources. The emphasis is to be proactive in order to commence the necessary development of a new workforce before the wave of retirements hits.

**Q. What specific steps has the utility industry begun to take to address the aging workforce issue?**

A. Approaches will differ by company, but core strategies have focused on hiring now in areas that will experience significant attrition in order to commence training and knowledge transfer, and beefing up current training efforts. There is also a general recognition that the available labor pool is finite and competition

for the new workforce could be significant as all industries face replacement needs.

Preparation includes figuring out how to recruit and train the future workforce. For example, the Midwest Independent System Operator or "MISO" has established relationships with colleges to begin developing skilled workers, and First Energy has partnered with five universities to create degree programs for future line and substation crews. (Energybiz Magazine, p. 24).

**Q. Does Vectren have workforce aging issues similar to the rest of the utility industry?**

A. Yes. Over the next 15 years retirements are expected to impact the Vectren workforce as follows:

| Bargaining Unit | | | |
|---|---|---|---|
| Years | Potential Retirements | Current Employment | % |
| 2007 – 2011 | 133 | 872 | 15.2% |
| 2012 – 2016 | 159 | 872 | 18.2% |
| 2017 – 2021 | 210 | 872 | 24.1% |
| Cumulative | 502 | 872 | 57.6% |

| Non-Bargaining Unit | | | |
|---|---|---|---|
| Years | Potential Retirements | Current Employment | % |
| 2007 – 2011 | 70 | 889 | 7.9% |
| 2012 – 2016 | 115 | 889 | 12.9% |
| 2017 – 2021 | 148 | 889 | 16.6% |
| Cumulative | 332 | 889 | 37.4% |

These tables suggest that over 47% of Vectren's current workforce will retire by the year 2021. This is especially critical in the bargaining unit employee group

where retirements will be nearly 58% of the current workforce. In addition, these amounts assume that potential retirements will occur, on average, when employees reach age 62. At Vectren South, actual eligibility for retirement with benefits occurs at age 55. In fact, actual experience over the past several years indicates an average retirement age for the bargaining unit of 60.5. Thus, the large numbers actually represent a fairly conservative estimate. As described hereafter, the wave of retirements will pose particularly serious challenges in certain areas of the bargaining workforce where trained technical Energy Delivery and Power Supply workers are essential to providing electric and gas services to Vectren South's customers.

**Q. Has Vectren South had a similar level of retirements in the past five years?**

A. While we have not seen a dramatic escalation in retirements as of yet, we have detected an increase in recent years. As shown above, we are very confident that we will see a major increase in retirements in the next few years.

**Q. How certain are you that these workers will retire in the numbers and time frames you describe?**

A. The age of the employees is an absolute fact known with certainty. The eligible retirement age and the average age of retirement for Vectren South employees are again absolute facts known with certainty. Therefore, I conclude that the tables shown herein and the conclusion that this is a critical problem for Vectren South and its customers is very real, and must be dealt with on a proactive basis to ensure continuity of good customer service at the lowest possible cost. Our own knowledge of these statistics caused us to invest time in the study and planning process I described earlier.

**Q. Can Vectren South do anything now to prepare for this inevitable loss of experienced workers?**

A. Yes, we must take action now to avoid a future shortage of skilled employees. For Vectren South, an approach of waiting to hire replacement workers as employees actually retire would leave us unable to maintain work levels and customer service levels because of the lengthy required apprenticeship training

process new bargaining unit employees must go through. Rather, we must implement a plan that brings on new employees in advance of retirements so that they can begin the up to four year apprenticeship training and be prepared to fill the role of retiring employees with decades of utility experience.

## VECTREN'S PLANNING APPROACH

**Q. Has Vectren South developed a plan to effectively manage the impact of the aging workforce problem so sufficient resources remain available to maintain reliable service?**

A. Yes, Several years ago Vectren South realized that this was a growing problem. In 2005 Vectren management established a "Workforce Planning Team" comprised of representatives from the Human Resources and Operations Departments. The Team began by breaking the problem into four major components:

Workforce Strategy – Determining the workforce requirements to achieve our business objectives and establish plans outlining how these workforce requirements will be met.

Workforce Planning – Analyze business requirements and plan the workforce to develop and maintain skills/competencies required to meet Vectren's objectives.

Training Development – Establish training priorities and evaluate program effectiveness relative to developing skills and competencies.

Knowledge Capture – Identify tools and methods used to capture the knowledge and experience of the workforce.

**Q. What progress has the workforce planning team made since its formation?**

A. The Workforce Planning Team determined that a critical need exists to hire significant numbers of new apprenticeship employees in the near term in order to have sufficient skilled employees in later years.

As background, in 2005 the focus of the Workforce Strategy effort was on building alliances with Midwest Universities to provide critical training at a reasonable cost. Work also included the establishment of an intern program and the aligning of Human Resources strategies with existing Energy Delivery initiatives (Asset Management, Work Optimization, etc.). The Workforce Planning effort upgraded bargaining unit hiring standards, and built succession plans below the manager level. The Training Development effort included collaboration with IVY Tech regarding annual training grants, evaluation of a variety of training proposals, and enhancement of in-house training programs. The Knowledge Capture effort included initiation of contacts with AGA, MEA, and EEI to begin a benchmarking program. Additionally, the Team began prioritizing and capturing knowledge in Energy Delivery.

In 2006, the Workforce Strategy effort began focusing on identifying competition for its workforce and determining what Vectren must do to stay ahead of the competition. The Workforce Planning effort gathered data related to historical average retirement dates, existing employee potential retirement dates, and specific critical skill gaps by classification. Additionally, they established plans for dealing with potential skill gaps. The Training Development effort continued to identify effective and low cost training alliances, and began identifying and improving internal training process opportunities. The Knowledge Capture effort focused on developing a process for the identification, capture, and communication of knowledge retention needs.

The team then reviewed each job classification to determine how retirements would impact performance. It became apparent that in many areas, the retirements could be managed over time without significant incremental effort, but that in certain areas, the turnover in the next 5-10 years would be unprecedented.

**Q. Has the team developed replacement strategies for both bargaining and non-bargaining employees?**

A. Yes. Generally, the Team has focused on improved processes for recruiting, training and developing employees. While key non-bargaining employees will also be lost, the approach to replacing such employees will be critical, but more individualized in nature. The Team has identified the need to aggressively hire a large group of bargaining unit replacements for two reasons. First, the exposure in numbers of employees the Company is at risk of losing is much higher. Also Vectren South has recognized that the training requirements and cycle needed to move employees from the apprentice level to a fully productive journeyman level in various job classifications is well defined in terms of time and content.

## AGING WORKFORCE IMPACT ON VECTREN SOUTH-GAS' OPERATIONS

**Q. How will bargaining unit retirements impact the Vectren South-Gas employee classifications?**

A. The pro forma adjustment I propose will address the aging workforce issues for bargaining unit employees in the Gas Fitter position and their immediate supervisors only. This strategy recognizes that the Gas Fitter position performs many important field activities, and that once experienced, these employees often move into other roles in the Energy Delivery Operations. It is in this job classification that we expect the near term effect of retirements to be most noticeable. I have included an adjustment reducing labor expense to reflect the expected retirements during the pro forma period.

**Q. Could you describe the process associated with filling the energy delivery openings generated within these job classifications with qualified employees?**

A. Yes. The specific skills required to become qualified to perform any of these job functions are not typically available in the marketplace and must be developed through apprenticeship programs. These apprenticeship programs typically take 3 to 4 years to complete. This lag-time between hiring and completion of the apprenticeship program means that the productivity of each new hire rises gradually over this period, both due to time dedicated to training activities and the natural learning curve. Essentially, in the early stages of the apprenticeship, 3-4

apprentices equal one experienced employee's productivity in these important jobs. These apprenticeship programs are designed with competency checkpoints every 6 months. Moreover, historical experience indicates that in certain areas such as Gas Fitter, approximately 25% of the apprentices drop-out of the program due to a variety of reasons including lack of appropriate skills or the desire to work as a Contractor where they perceive the potential for more income through overtime.

**Q. Please describe the Gas Apprenticeship Program more fully.**

A. The apprentice program is a four year long combination of classroom, laboratory and field training. Over the course of the program the apprentice will learn, practice and then demonstrate actual application of the appropriate skills. This is done under the observation and tutelage of professional trainers and journeymen. The program covers all major aspects required to carry out the day to day responsibilities of service, construction, operation and maintenance of a gas distribution system. In addition to the physical skill training, other key areas such as the attributes of natural gas, work safety, customer service, company policy and equipment operation are all interwoven in the program.

The main elements are taught at the Company's training center or other locations where classroom and controlled laboratory conditions are available. The field work is completed in the apprentice's home area using local journeymen as their mentors and field trainers. The classroom work is grouped in sections and when the candidates successfully complete the session, they return to their home base to gain the actual field experience in the trained areas.

Typical apprentices spend four years in this program before graduating to a qualified journeyman type job classification which varies, depending upon the individuals represented union affiliation.

**Q. When will Vectren South commence hiring apprentices to replace the upcoming retirees?**

A. The hiring is driven by projecting the timing of retirements and the level of staffing over time required by the Company. This analysis has been applied to each job classification. By way of example, in Energy Delivery South there are currently 36 Gas Fitters. Using a projected retirement age of 62 years, which is conservative since many employees are choosing to retire earlier, Vectren South will lose 12 of these Fitters over the next decade. Thus, in a 10 year planning period, we will lose 33% of the workforce. We must stage hiring to train groups of new employees to offset these retirements, and we must account for attrition. We have determined that the timing of anticipated retirement calls for two hires in 2007 so that by the time the new employees are hired and fully trained we will be ready for the retirements expected over the next several years. This plan is not without risks. Variables include the actual timing of retirements, the speed with which the trainees gain skills and the number of apprentices who successfully complete the program. We have applied the same approach across the Energy Delivery job categories by timing hires in the near term to replace the growing number of retirees.

**Q. Is this approach reasonable?**

A. Yes, after reviewing how the industry is considering addressing the aging workforce issue Vectren South proposes to follow a similar approach. The HR/Operations team has summarized the issue for the Company as follows: "We are a highly regulated and technical business that requires talented employees who possess specific competencies and skill sets. In the next few years, we are expecting retirements to be at a pace that may double or triple historical levels. Because of that risk, we are looking at all of our key HR and training processes to ensure we will be able to recruit, assimilate and develop new Vectren Colleagues at a more rapid pace than any other time in Vectren's history." As discussed, Vectren South has begun to work with local universities on plans for training potential employees, and is also engaged in internal efforts to create more efficient work processes and means of capturing and transferring knowledge.

Vectren South has determined that it will manage loss of non-bargaining personnel through traditional recruiting efforts, although internal succession planning and training efforts will require greater emphasis in an effort to better prepare the existing employees to step up and fill vacancies. Additional staffing and contract costs expected to be incurred in the Human Resources area to support the higher turn-over to support our approach to the aging issues, including focusing on the need to address non-bargaining employee retirements are described elsewhere in my testimony.

**Q. Is Vectren South's historic training program capable of handling this large influx of new hires?**

A. No. As discussed further, in conjunction with hiring the next generation of workers, we must anticipate their training needs and increase our resources to assure the apprenticeship program yields well trained, skilled employees.

## Aging Workforce Pro Forma Adjustment

**Q. What is the impact of the aging workforce adjustment for Energy Delivery-Gas operations as shown in Petitioner's Exhibit MSH-2 Adjustment A16?**

A. Petitioner's Exhibit WSD-2 is a summary of the Energy Delivery-Gas Operations Aging Workforce pro forma adjustment. Petitioner's Exhibit WSD-3 is a table consisting of active employees, planned hires, and the number of eligible retirements in the years 2007 – 2025 by classification for Energy Delivery. Petitioner's Exhibit WSD-2 depicts the calculation of the pro forma adjustment for labor costs and the allocation to Energy Delivery. Energy Delivery plans to add two Fitter apprentices initially, an allocated portion of a Training Manager, and an allocated portion of supervisor replacements. These new employees result in additional bargaining unit labor costs of $66,003, and additional allocated labor cost amounts of $12,517 for a Training Manager and an allocated share of an additional Supervisor of $28,611. We have included an offset to that adjustment amount of $(45,997) reflecting a reduction in labor costs due to retirements during the pro forma period. In addition, Vectren South-Gas proposes to include

training costs of $6,060 and contract labor costs of $116,740 as pro forma adjustments in the test year. The contract costs will decline in the future as more Fitters are added due to future retirements. As that cost declines, the labor costs will coincidentally increase.

The Gas Fitter is a critical field position, and in order to provide customers with the service they expect, we must have adequate contract and Vectren resources available. I have also included the costs of an Engineering Cooperative to provide cost effective engineering expertise to Vectren South and also identify excellent prospective engineering employees in the future. The cost associated with the Engineering Cooperative is $8,901. The total impact of the items noted above is $192,835 and is included in the aging workforce pro forma adjustment A16 of Petitioner's Exhibit MSH-2.

**Q. Is that the entire amount of the aging workforce pro forma adjustment for Vectren South Gas operations?**

A. No. There is also a Human Resources Department component of the adjustment that is needed to manage the response to our aging workforce. I will explain that adjustment later in my testimony.

**Q. Please further discuss the use of a Gas Fitter job classification to support the pro forma adjustment.**

A. The impact of aging workforce is most evident in the Fitter job classification for Vectren South Gas operations. We have focused on this job classification as it is considered a feeder position for other classifications, such as the Utility Attendant, requiring a significant amount of training and apprenticeship time. Fitters are responsible for all aspects of installing gas pipe in the ground. They do the trenching, lay the steel or PVC piping, join piping sections at joints and unions, and perform testing and verification to make certain the newly installed pipe is safe and ready to be pressurized and placed into service. Once trained and experienced, these employees then "feed" other jobs in the Company. Without a sufficient number of these employees, we will be hard pressed to maintain sufficient staffing in other job areas.

Moreover, Vectren South must replace the retiring employees to maintain adequate numbers of employees needed to perform essential distribution system work activities such as leak repairs, line inspections, regulator inspections and maintenance, valve inspection and maintenance, and numerous other operations tasks. These tasks are essential to maintain a safe, reliable distribution system and good customer service. Due to retirements and an ongoing effort to keep rates and operating costs low, Vectren South employee levels are already at minimum levels. A further workforce reduction could negatively impact customer service.

**Q. Are there other reasons why the additional employees must be added now?**

A. Yes. Vectren South anticipates challenges in maintaining its necessary workforce in the future due to two related but separate issues. First, we anticipate an overall worker shortage as the effects of the retiring baby boomers are increasingly felt in the labor market. It is generally agreed upon by experts in the labor market that such shortages will occur and may significantly compromise Vectren South's ability to hire employees when they are needed. Second, the numbers of future workers electing to pursue the craft trades and become trained Fitters is even more reduced than the overall constrained future labor pool. We anticipate a very competitive market it the future for Fitter apprentices and journeymen. Vectren South is not willing to risk compromises in customer service and safe field operations due to worker shortages in the future and believe we should proactively hire these needed replacements now so they will be fully trained and in place as fully productive employees as they are needed.

**Q. Why must you incur incremental contract labor costs during the period of time the new employees are in their apprenticeship and training programs?**

A. As the new employees are trained and utilized, we have observed that they are only partially productive while building knowledge and experience for the first several years. Therefore, I have included a productivity factor for the apprentices during their first four years of employment. I have factored in that apprentices are 50 % effective in the first year, about 60% effective in the second year, 75% effective in the third year, and about 90% effective in the fourth year, and do not

become fully productive until the beginning of the fifth year. During this ramp up period, we will use contractors to fill the gaps and perform work that more experienced employees would have performed. This need to maintain overall productivity and consider the ability of our new resources supports the pro forma adjustment reflecting the additional contract labor costs necessary to serve customers.

**Aging Workforce Implications on Human Resources**

**Q. Please discuss the aging workforce-related effects on the Human Resources Department.**

A. Vectren South Energy Delivery (as well as the rest of Vectren's operations) will require significant support from Human Resources (HR) to manage our way through the aging workforce challenges. HR plans to use an optimized blend of additional employees and outside contract services to provide the most cost effective support resources to the Vectren South workforce. In particular, there are five areas of support that will be required from HR. They are:

- Retirement education and planning. As workers prepare for retirement at a level that will be 2 – 3 times the present pace, there are many questions and issues to address. Particular attention will be paid to financial planning, insurance issues, and health care concerns. Due to the extensive specialized information required, retirement education and training will be administered by Vectren South and provided by a contract firm. This resource will provide support across the organization and the cost is therefore allocated. The Vectren South-Gas allocated amount is $10,560.

- Safety Training. New employees will require significant amounts of safety training to ensure a safe work environment. In addition, OSHA and DOT have compliance requirements that Vectren South-Gas must meet. The training will focus particularly in the areas of critical equipment operations, accident prevention, and systems and tools training. Accordingly, there will be a significant amount of training provided by specialized contract firms

which will provide a cost effective approach to providing these services. The Vectren South-Gas allocated amount for safety training is $151,545.

- Recruiting. In the tight labor market will be a continuous challenge. Obtaining the best possible individuals for Vectren South-Gas' work force is a critical task. In addition, Vectren South-Gas continues its efforts to diversify its workforce and must apply additional specialized recruiting techniques and resources to ensure that all qualified candidates are considered for employment in all jobs throughout the company. As part of the recruiting effort, HR will also perform pre-employment testing. The adjustment for recruiting consists of one FTE and specialized contract services for general recruiting and diversification search firms. The Vectren South-Gas allocated amount of these labor costs is $5,037. The allocated non-labor recruiting amount is $29,040.

- Supervisor Training/Leadership Development. Supervisory training will be driven in part by the aging workforce requirements as they affect both bargaining unit and non-bargaining unit positions. Succession planning relates to existing employees. In the area of succession planning, there will be significant efforts in identifying employees who have potential to replace retiring employees in supervisory jobs, and engaging in skill development for those employees that will prepare them to move into positions that open up as a result of retirements. An example would be using resources from local universities to provide continued education opportunities. Since we have not included a pro forma adjustment for actually hiring employees to replace supervisory vacancies that will occur in both the bargaining and non-bargaining areas, this exercise is very important to maintain expertise and train the future leaders in the Company. The Vectren South-Gas allocated labor amount is $5,037 and the non-labor amount is $26,400.

- HR Employee Services. With the turnover anticipated at Vectren South-Gas we anticipate a major increase in compensation and benefit queries, employee handbook updates, and medical benefits questions. We must be prepared to serve our employees promptly and with the best possible

information we can provide. Successfully providing these services is essential to employee satisfaction, which is absolutely critical to hiring and retention of qualified and motivated employees. It has been our experience that satisfied employees provide good service and good performance resulting in satisfied customers. Vectren South-Gas has traditionally kept its support staff at the minimum needed to serve its employees effectively. This is borne out by a review of industry data that shows we have a smaller HR staff than our peers. However, it is anticipated that the aging workforce impacts on operations and support areas will increase workload significantly for this small staff. Therefore, HR proposes to add one FTE to augment existing staff and provide adequate service to employees in all HR service areas. The Vectren South-Gas allocated amount of this adjustment is $9,957.

**Q. Do you support the need for these additional HR resources and programs for your operations area?**

A. Yes I do. For many years, I have worked closely with the HR department and I rely on them heavily to help supervise and manage issues related to our workforce. These employees and programs will aid in building and maintaining the type of workforce that Vectren South-Gas' customers will need in the near future. Recently, Vectren compared its HR function with the utility industry using information from the Saratoga Group, an internationally known HR analysis firm. We found that Vectren is extremely efficient, with a ratio of 1:148 HR employees to non-HR employees compared to the industry average of 1:89. Based on this metric, I am quite comfortable supporting these additional HR resources. These adjustments are very reasonable and are clearly needed by the HR area to effectively support my operations areas.

**Q. What is the total impact of the Human Resources component of the overall aging workforce adjustment?**

A. While aging workforce is certainly a driver of the HR adjustments, as I have indicated, HR is an area where we could have for some time justified additional resources to better serve our employees. Petitioner's Exhibit WSD-2 shows the three additional HR FTEs result in a pro forma adjustment for Vectren South-Gas

of $20,031. The non-labor portion of the HR aspect of the adjustment, consisting of consulting resources and training costs, is $217,545. The total HR pro forma adjustment related to Vectren South-Gas is $237,576.

**Q. What then is the total impact of the Vectren South-Gas aging workforce adjustment?**

A. When combined with the gas operations amount discussed previously of $192,835, the total pro forma adjustment for Vectren South-Gas is $430,411 as referred to in Petitioner's Exhibit MSH-2, Adjustment A16.

**Q. What are the foreseeable consequences if you fail to fill the Energy Delivery positions?**

A. The Fitter positions are front-line positions that interface directly with the distribution system function and safety and Vectren South-Gas' customer service. It is my judgment, and a reasonable conclusion, that customer service levels will decline in the next ten years if these positions are not filled at this time. The areas most affected by these employees in Vectren South-Gas' Energy Delivery operations involve system leaks and repair, as well as new business gas service connections. These tasks directly affect reliable and timely customer service.

**Q. Why is this adjustment reasonable?**

A. Vectren South-Gas has made every effort to keep rates low by managing employee numbers to the lowest reasonable level by using attrition and replacing only those jobs that are required. This strategy has worked well for several years. Now we need to respond to conditions and match future workforce levels to the requirements of the gas delivery system and Vectren South-Gas' customers. While these additional employees, training costs, and contract labor components result in cost increases, adding the employees now and having them in place as retirements occur is a prudent, necessary, and reasonable approach resulting in the lowest possible cost of operations and good customer service levels. The need for and benefits of planning for competent replacement employees make this is a very reasonable adjustment.

## III.

## TRAINING AND SAFETY PROGRAMS

**Q. Does Vectren South-Gas propose to expand its training for its field gas employees?**

A. Yes. In addition to the apprenticeship and other on the job training I have described that is provided to new gas field employees, Vectren South-Gas will implement a new emergency response and safety continuing education program for existing field employees. This will ensure that they are up to date and aware of current procedures to safely address emergency situations such as the odor of gas, actual gas leaks, building fires, accidents involving gas meters, severed underground gas lines, and other situations of risk of fire or explosion from natural gas. They will receive more frequent and recurring training in activities such as evacuating the area, assessing area risk, determining the nature and location of risk, coordinating contact and action with other company representatives and emergency responders, preservation of the scene, and other actions to protect the public safety. This will include recurring updated training on emergency procedures. The emphasis will be on customer and employee safety in situations of emergency response. This training occurs already; however, we believe that our employees and the public will benefit from greater repetition and enhancement of these programs.

**Q. Is the gas employee training you have described a reasonable and necessary expense?**

A. Yes. This training is necessary to increase our employees understanding and compliance with procedures and safety requirements relating to emergency field operations. Safe and effective response to emergencies requires employees to go beyond mere compliance with procedures and make effective judgments and interpretations regarding circumstances they face. This additional training is important to developing the skills to make appropriate decisions in emergencies and reduce the risk of customer and employee injuries.

**Q. As part of worker safety efforts, does Vectren South-Gas participate in disaster simulations?**

A. Yes. Our employees participate in emergency and disaster simulations as part of their ongoing training. In addition, we conduct "mock" emergencies to verify our ability to promptly and correctly respond to field emergencies. Although we have a good working relationship with the various local emergency first responders such as police departments, fire departments, Homeland Security, and local Emergency Management Agencies, we plan to include these agencies more extensively in our future emergency simulations.

**Q. How do these activities benefit Vectren South's Gas customers?**

A. These activities help protect the safety of emergency responders, construction workers, and all individuals who may be in the vicinity of an emergency situation. Participants at these emergency simulations learn how to effectively communicate and coordinate their activities so as not to impede each other and to work as a team. Vectren South employees learn necessary information and refine their skills in coordinating their utility expertise and efforts with the objectives and skills of other emergency personnel. Similarly, non-utility emergency personnel learn from Vectren employees what must be done to avoid injury from utility services such as natural gas and how emergency responders can accommodate efforts at service restoration. Through the increased knowledge and enhanced coordination of all participants, these activities result in more prompt restoration of utility service.

**Q. What is the annual cost of this continuing training and these safety programs?**

A. The additional annual cost of this new continuing training is $37,088 and is included in Petitioner's Exhibit No. MSH-2, Adjustment A14.

**Q. Do you have other plans to address worker safety in the near future?**

A. Yes. Vectren South-Gas plans to add a Safety/Hygiene Consultant to conduct field audits for employee and contractor safety compliance. It is Vectren's objective to achieve best in class safety performance on a timely basis. Hiring

and deployment of a Safety/Hygiene Consultant will assist in accomplishing that objective.

**Q. What will be the duties of the new employee?**

A. The new employee will conduct field safety audits and facilitate the enhancement of field "tailgate" worker training sessions which focus on use of protective equipment and safe work practices. The new employee will also lead safety compliance reporting, conduct audits to ensure required training is completed on a comprehensive and timely basis, develop safety training materials, conduct safety presentations, act as the liaison with medical facilities in the event of employee injuries and return to work physicals. The new employee will also coordinate drug and alcohol testing, and determine cost effective ways in which Vectren South may reduce job induced routine physical and emotional stress on employees.

**Q. What is the pro forma expense associated with the safety/hygiene employee?**

A. The Vectren South-Gas operations allocated annual cost impact is $14,835 and is included in Petitioner's Exhibit No. MSH-2, Adjustment A15.

## IV.
## ASSET MANAGEMENT TRANSFORMATION

**Q. Please describe Vectren's Asset Management Transformation initiative.**

A. Asset Management Transformation ("AMT") was initiated in 2004. AMT is a multiyear program intended to more efficiently manage Vectren's pipes, wires and people – Vectren's assets. AMT uses structured programs, standardized work practices and an increased use of information technology to enable sustainable cost control. The AMT project is divided into the following tracks: 1). Capital investment planning and budgeting process; 2). Engineering programs and practices for project design standardization; 3). Work execution initiatives; and 4). Implementation of performance management techniques to better measure the success of these initiatives.

Each of the AMT tracks represent focus areas that, when combined, will enable Vectren South to target its capital investment decisions on infrastructure that will achieve our objectives with the lowest capital and O&M costs. Asset analysis tools will be deployed for input on capital spending decisions. New technology and processes will be implemented to allow Vectren to successfully complete the work in the most efficient way possible. Lastly, performance measurement tools will be implemented to review the resulting processes and insure continuous improvement via key performance indicators.

**Q. Why has Vectren undertaken AMT?**

A. The primary driver for undertaking AMT is to implement a more structured set of processes across Vectren's Energy Delivery organization in support of our capital investment management practices – from beginning to end. By focusing improvement opportunities on the core utility infrastructure practices and processes, we believe we will better position Vectren South to more effectively meet the challenges it faces while serving our customers at a reasonable cost. Over time, this focused approach to asset investment decisions, process standardization, and how we perform our core utility work will result in a culture of continuous improvement and enhanced reliability, safety, service delivery and overall efficiency.

While historically Vectren South has operated efficiently, we continue to strive to increase our financial and operational efficiency by optimizing the deployment of our workforce and capital assets. Moreover, as described elsewhere in my testimony, as part of responding to the loss of so many skilled and experienced older workers, Vectren seeks to become as efficient as possible so that replacement workers have every advantage as they take on their roles of providing quality service.

**Q. Please describe how AMT works.**

A. The AMT initiative allows Vectren South to review many related work practices and maintenance programs that inherently link to capital investment

management. Work management efforts using the AMT technology implementations, over time, will be expanded to include additional work types. Facility analysis will begin to occur as more information is gathered on work practices and work volume. Overall organizational design will be assessed as more information is gathered on the technology and process changes contemplated by AMT. Pro-active, preventative maintenance programs will be designed for asset longevity. AMT will become the foundation for a continuous improvement model at Vectren South.

**Q. Is the AMT initiative complete at this time?**

A. No. The AMT project is in its early stages. Our early improvements have been driven by policy, and maintenance practice changes. Additional technology and technology enablers are not yet deployed. The current projected schedule includes the roll out of additional technology and process improvements over a period of three years, and with all such changes, there will be a learning curve in order to achieve the desired benefits.

**Q. Does the AMT initiative impact engineering considerations and the timing of transmission and distribution asset maintenance and replacement?**

A. Yes. We are early in the process of developing these strategies, partly because the system is not yet fully deployed and partly because of the need for some additional engineers to help formulate the strategies. As part of AMT, Vectren has undertaken the effort to formulate strategies for asset management in our transmission and distribution systems. A detailed analysis of the transmission and distribution system to determine component performance and evaluation of the results of that study will be used to optimize maintenance work schedules, inspection interval schedules, improve asset performance, and optimize asset placement and design.

**Q. Do you anticipate this aspect of AMT will be successful?**

A. Yes. The engineering aspects of asset management are fundamental to improving asset utilization and optimization. The asset management system will allow us to link our operation, maintenance and capital costs to our specific

assets which will provide valuable information about our assets and allow us to develop effective strategies to improve our assets and thus improve the performance, reliability, safety and operation of our systems.

**Q. Are you aware of other instances where AMT has been deployed in this manner and proven successful?**

A. Yes. Asset management systems and processes are deployed at many utilities. Specifically, Vectren visited companies such as Keyspan, Columbia Gas, and Atlanta Gas Light to review their system and process implementations. This allowed us to review the benefits they have received since the implementation and discuss ideas around strategy development and asset optimization. There are many others throughout the industry who also have begun similar AMT deployments.

**Q. Please provide some background information on the pro forma adjustment to include costs associated with enhancing mobile technology.**

A. As part of the AMT initiative specific to the Work Execution track of the project Vectren Energy Delivery will be deploying an additional 350 mobile devices, a 140% increase in units currently in service. In addition, 75 units currently in service will be replaced by units with multi-communications capability. Mobile units have greatly increased field workforce productivity by allowing technicians to interface directly with support systems and customer data.

In addition, Automatic Vehicle Locating (AVL) will be deployed in the Energy Delivery vehicles equipped with mobile devices. AVL utilizes Geographic Positioning Satellite (GPS) technology to allow Vectren South to locate its vehicles and employees instantly over its geographically dispersed region. It also allows Vectren South to assign the geographically closest resources to its customer or system needs.

**Q. What resources will be needed to deploy this new technology effectively?**

A. Vectren South must add a System Administrator, an IT Desk Technician, and a Programmer Analyst to effectively install, operate equipment, train users, and

maintain the new equipment. The non-labor portion of the cost gas allocated to Vectren South-Gas operations is $65,687. The labor portion of this pro forma adjustment is $12,444. In total, the costs allocated to Vectren South-Gas are $78,131 as shown on Petitioner's Exhibit MSH-2 Adjustment A32.

**Q. While in its early stages, has the AMT initiative produced any benefits?**

A. Yes. As described above, by its nature, AMT will roll out technology over time and, factoring in the associated training period, Vectren South will see benefits over the longer term. AMT programs implemented throughout the utility industry are realizing benefits in the area of capital investment strategies – again accomplished through more standardized engineering design processes and more efficient work execution. In addition to capital management savings, longer term savings are being realized across the industry in the operating and maintenance areas of the utility as well due to focused capital investments on those assets costing the most to maintain. Vectren believes opportunities exist for both reduced capital costs in our selection and execution of work and, over time, the potential for reduced operating and maintenance costs as we better target our future capital decisions. Vectren also believes that other work practices and processes will benefit from AMT by proliferating best practices occurring within Vectren.

**Q. Has the AMT initiative yielded savings included in this rate case?**

A. Yes. The initial cost reductions of $(18,599) have been estimated and are reflected on Petitioner's Exhibit No. MSH-2, Adjustment A33.

## V.

## DISTRIBUTION GAS MAINTENANCE AND ENGINEERING PROGRAMS

**Q. Please describe Vectren South-Gas' proposed regulator station maintenance activities.**

A. This program consists of sandblasting and painting regulator settings and buildings, improving security, installing and replacing signage at regulator station facilities. There are 150 stations with regulator settings exposed to the elements. These will be sandblasted and painted on a five year cycle. Currently we perform required maintenance and repairs on regulator station equipment during regularly scheduled inspections. The proposed programs place greater emphasis on planned preventative maintenance which increases the life expectancy of these stations and reduces future maintenance costs.

There are 391 stations that are mainly located in residential or commercial neighborhoods. These must be maintained to fit into their community surroundings. Vegetation from fence rows must be removed not only for aesthetics but also for added visibility and security. Nearby trees and other apparatus that would allow individuals to gain entry to the stations must be removed. Gravel will be added along the bottom of the fencing and on roadways to allow continued access and prevent erosion. Bilingual signage providing warnings and contact information would be replaced or installed. Protective light reflectors would be installed to better illuminate and make the facility visible to oncoming traffic.

There are approximately 34 station buildings that are metal and will be painted on a five year cycle to improve aesthetics and minimize corrosion.

**Q. What is the total additional annual cost of these regulator station maintenance activities?**

A. The total additional annual cost is $436,400 and is included in Petitioner's Exhibit No. MSH-2 Adjustment A19.

**Q. Please describe other activities Vectren South will perform to improve the conditions of its facilities.**

A. Vectren South will fill pipe casings to ensure cathodic protection is working properly for gas pipelines placed inside of steel casings under areas such as roads and railroads. If the pipelines come in contact with the casings, cathodic protection is lost and the pipelines will corrode in the area of contact. To prevent this from occurring, the casings will be injected with an insulating substance. Approximately 30 casings will be addressed. We will attempt to perform this work within the next 2-3 years. The total project cost is estimated to be $120,000, but given the multi-year efforts, we are including $40,000 of cost in an adjustment.

With respect to another type of facility that needs to be addressed, Vectren South-Gas has approximately 25 pipelines attached to bridges. Vectren South-Gas has determined that these pipelines need to be recoated in order to maintain their cathodic protection, prevent corrosion and damage. As with regulator stations, we currently perform required maintenance and repairs during regularly scheduled inspections. The proposed program increases planned preventative maintenance activities which increases the life expectancy of these facilities. Again, we intend to perform this activity over the next 2-3 years, with follow up checks on the condition of these exposed pipes. For purposes of this case, we have reflected one-third of the total project cost, or $41,000, to cover the possibility that the program will extend over 3 years.

Customers will benefit from these maintenance programs which will extend the life of our assets and allow us to continue providing safe, adequate, and reliable gas service to customers.

Similar to other regional utilities, and consistent with good utility practices, Vectren South will also implement a routine practice of flyover inspections for its gas transmission and distribution system. Flyover inspections would be conducted for approximately 90 miles of natural gas transmission pipelines. Flyover inspections permit visual evaluation of right-of-way conditions and line

clearance requirements. These inspections assist in evaluating development, construction and other public activities adjacent to our lines that must be assessed as part of our pipeline safety programs.

**Q. Please describe Vectren South Gas' right of way clearance program.**

A. Through this program, Vectren South-Gas keeps its gas pipeline rights of way mowed and clear of trees, shrubs, foliage, and debris. These rights of way must be kept clear so that workers and equipment have access to allow for necessary repairs, replacements, or connections. Of equal importance, is public safety. These rights of way must be kept clear so that they may be visually inspected for signs of gas leakage. Also, we unfortunately have instances where debris is dumped on rights of way in rural areas and must be cleaned up. This program makes sense, and is especially timely given the Gas Distribution Integrity Rules that should be finalized next year.

**Q. How many miles of gas pipeline right of way must be kept clear?**

A. Vectren South-Gas has approximately 435 miles of gas pipelines rated over 60 psi. Twenty-seven miles of this amount are transmission lines that will be cleared through our pipeline integrity efforts and are not part of this gas pipeline right of way clearance. Portions of the remaining mileage will be cleared to maintain the easements. Having clear access to our gas line easements increases the reliability of service through more efficient surveys, patrols and pipeline identification and enhances safety by allowing us easy access to locate leaks and identify excavation activity at or near our pipeline. To achieve this level of activity, the annual right of way clearance costs will increase by $109,200.

**Q. What is the total annual expense of these gas distribution maintenance programs?**

A. The total annual expense is $636,600 as reflected in Petitioner's Exhibit No. MSH-2 Adjustment A19.

## VI.

## CUSTOMER CONTACT CENTER

**Q. Please describe the Vectren customer contact center.**

A. Constructed in 2001, Vectren's customer contact center in Evansville is the telephone call center for all Vectren Energy utility operations. There are over 180 customer representatives located in Evansville. Vectren has contracted with an outside contractor who provides another 70 call handlers. The contact center handles customer calls and on-line inquiries regarding emergencies, power outages, billing, service, disconnection, payment arrangements, and information inquiries. The contact center also handles inquiries from assistance agencies, township trustees, and other support services groups in coordinating assistance for their constituents that are Vectren customers. The contact center has a special assistance group to handle calls from and promptly provide information to the Indiana Utility Regulatory Commission's Consumer Affairs Division.

**Q. Has the level of customer calls increased?**

A. Yes. From 1,981,735 in 2002, the number of annual customer calls has increased each and every year. In 2005 the customer contact center received 2,930,301 calls. Call volume thus far in 2006 is trending very close to 2005 levels. We anticipate that we will soon roll out our conservation programs that should further increase call volumes.

**Q. In your opinion, why have call levels increased so much?**

A. A primary cause is the increase in the energy commodity costs. Throughout this period, customers experienced more volatile and frequently higher commodity costs. Prior heating season energy costs and warnings issued regarding high energy costs in the 2005-2006 heating season have resulted in increased customer inquiries. Vectren conducted a vigorous media campaign preceding the 2005-2006 heating season to inform customers of high natural gas prices, encourage them to participate in our budget billing program, and practice energy conservation. Increased energy costs have resulted in higher call volumes

regarding budget billing, payment arrangements, disconnection notices, disconnections, reconnections, and payment assistance programs.

**Q. How effective were efforts to encourage enrollment in budget billing in Vectren South?**

A. They were very successful. There was an unprecedented increase in budget bill enrollment of 88% from 9/01/2005 to 3/31/2006.

**Q. What payment assistance programs have added to call volumes?**

A. A significant number of customers called during the heating season asking for information and to enroll in Indiana's new Help Thy Neighbor program. Vectren processed over 6,200 applications for the Vectren South area during this assistance campaign. Customers also called asking for information regarding Vectren's Share the Warmth program, Universal Service Program, the LIHEAP program, and assistance that may be available from community action and social agencies.

**Q. What was the total amount of financial assistance provided to Vectren South's customers in the 2005-2006 heating season?**

A. Vectren South's customers used $4,415,661 of financial assistance, a 47% increase over the preceding heating season. This financial assistance represents the period November 2005 through July 2006 vs. November 2004 through July 2005. This includes the period through July because we continue to receive heating assistance transmittals from agencies into the summer months. We do not track energy assistance in the Vectren South area by "gas only" with the exception of the Help Thy Neighbor program that was specifically for gas space heating customers.

Assistance was provided to customers through the various programs as follows:

- $2,484,003 LIHEAP
- $158,383 Charitable Organizations
- $1,161,689 Universal Service Program
- $300,713 Township Trustees

- $310,873 Help Thy Neighbor
- Total $4,415,661

Not surprisingly, with dramatic increases in benefits, associated customer contact calls also increased.

**Q. How important are the services of the contact center?**

A. Customer contact is critical to customer satisfaction, efficient operation of the utility and other regulatory stakeholders.

The contact center is the primary channel through which customers provide and receive information regarding service transactions, billing issues and payment services. That flow of information needs to be prompt and accurate in order to satisfy the needs of customers. Without prompt and accurate communication between the customer and the utility, unpaid balances increase, disconnection levels increase, and customer needs and concerns are not fully addressed.

**Q. Have additional contact center employees been added to meet the needs of Vectren South-Gas' customers?**

A. Yes. The customer call center staff consists of a professional, hardworking and dedicated group of individuals. We monitor the productivity and performance levels both at the center and individual agent levels of our contract call center. It is simply impossible to handle the increased customer call volumes without increasing call center staff. Between October 2005 and February 2006, we added 25 agents in the Evansville Contact Center (first as temporary employees and then hired as permanent employees in July 2006) and 35 more agents were added at our outsource contractor site. These additions necessitated the addition of two new Performance Assurance representatives to handle the scheduling of these resources, perform call quality monitoring, and assist in their training. The additional Contact Center personnel are essential to meeting our workload and the needs of our customers.

**Q. Have you seen an improvement in your contact center metrics as a result of these additional resources?**

A. Yes, an immediate improvement was realized in December 2005 over 2004 performance. As these agents became more efficient and the additional agents were brought online in February 2006, our performance numbers have continued the favorable improvement trend as indicated below:

- December 2004 average speed of answer (ASA) of 4 minutes 11 seconds
- December 2005 average speed of answer (ASA) of 3 minutes 23 seconds; This is an improvement of 19%.
- January 2005 vs. January 2006 saw a 33% improvement in the monthly ASA. (5:10vs. 3:26)
- February 2005 vs. February 2006, a 22% improvement was seen. (5:45 vs. 2:41);

This sustained improvement can best be demonstrated by looking at our May 2005 vs. May 2006 statistics.

- In May 2005, 222,728 calls were handled at an average speed of answer of 2 minutes 18 seconds.
- In May 2006, 227,730 calls were handled at an average speed of answer of 15 seconds.
- In fact, while handling 2% greater call volumes, an 89% improvement in the speed of answering these calls was achieved.

These improvements have meant not only an improvement in the customer experience as they attempt to reach our contact center agents, but have also improved the morale of our agents and allowed us the opportunity for remedial skills training in such things as telephone etiquette, showing empathy for the customer, etc.

**Q, Are the new contact center employees fully reflected in the test year?**

A. No. Because of when they were hired, both Vectren employees and contract resources, the expenses are not fully reflected in the test year. The annualization of these call center costs results in an adjustment of $118,466 as shown on Petitioner's Exhibit No. MSH-2 Adjustment A22.

## VII.
## REVENUE ASSURANCE

**Meter Reading**

**Q. Please describe the adjustments that Vectren South-Gas proposes to be approved for meter reading costs.**

A. Every month approximately 117,500 Vectren South gas meters are read and the readings are processed for billing. Vectren South-Gas uses contract meter readers for 60% of its meters and Company personnel for the remaining 40%. One of Vectren South-Gas' largest contract meter reading providers proposed to increase the cost of its service. In response, Vectren South-Gas looked for ways to avoid the proposed increase. As a result, Vectren South-Gas entered into contracts that took effect July 28, 2006 with two different contract meter reading companies. By doing so it avoided a much larger increase in the cost of meter reading and obtained more favorable contract terms. The new meter reading contracts require only a 1.5¢ increase per meter read. Part of the increase in contract meter reading expense is also driven by an approximate 2% annual increase in the number of meters read. This increase in the number of meters is the result of new construction and transitioning meter reading routes from Company personnel to contract readers through attrition.

**Q. Does Vectren South plan to continue using contract meter readers in the future?**

A. Yes. We will continue to rely upon contract meter reading in the future.

**Q. What is the additional annual expense resulting from increased contract meter reading rates and other costs?**

A. The annual increase for Vectren South-Gas is $26,001 as reflected in Petitioner's Exhibit No. MSH-2 Adjustment A21.

## CUSTOMER BILLING COSTS

**Q. Please generally describe the work process of Vectren South-Gas' billing center.**

A. Our billing system design and function is intended to operate efficiently and accurately. Each month 117,500 meter reads are received at our billing center. Meter readings are received electronically from throughout our service territory. Once received, the meter reads are entered into the billing system. Consumption is calculated and compared with established parameters, and usage outside those parameters results in an exception report. The billing group researches the exceptions and must clear them before a bill is generated. Once the bills are generated, they must be processed for mailing and mailed. All of this must be accomplished within a two-day window in order to provide the bills to customers on a timely basis.

**Q. What changes in the customer billing department have occurred that should be addressed in this proceeding?**

A. The workload in several areas of billing has increased substantially as have certain expense levels. First, the 5.4% postage increase that became effective January 1, 2006 requires an annual adjustment of $15,627 as allocated to Vectren South-Gas. This covers the increased cost of mailing bills to customers. According to the U.S. Postal Service website, an additional 7.7% increase will become effective during the spring of 2007. That upcoming increase is not currently reflected in proposed rates but may occur before the end of the pro forma period. This increase of $15,627 is reflected in Petitioner's Exhibit No. MSH-2 Adjustment A24.

Second, Vectren intends to hire 12 new employees to fill a variety of roles in the billing area and allocate a portion of these costs to Vectren South. Over the past 6 years, we have made substantial investment in our Customer Information and Billing System. This system has improved processes and access to data. Now, with increasing demands on employee time due in part to customer issues related to high gas costs, as well as efforts to improve quality, we have

determined that the additional employees in the billing area that will work with our systems will add value and benefit our customers. The new jobs are as follows:

Administrator of Deposits. This position will administer and oversee the deposit process which includes deposit adjustments, transfers, refunding customer deposits as required per the Commission's customer deposit rules, and properly accounting for customer interest earned. Currently, no particular employee is assigned to oversee the Deposit process. The number of Vectren South-Gas' customer deposits to be handled doubled from 2002 to 2005 resulting in a periodic backlog of deposit work. The current heavy level of work in this area will continue in the future. In order to fulfill those functions on a timely basis, an additional full time employee is necessary.

Incomplete Disconnections for Nonpayment. An additional full time employee is required to administer the disconnection of customer service for nonpayment. Vectren South works closely with customers to help them budget their bill payments, to structure payment plans for customers in arrears, to provide heating assistance through Help Thy Neighbor, Share the Warmth, LIHEAP, and financial assistance through social and community action agencies. Vectren South has been both diligent and successful in helping customers address bill payment problems and continue utility service. Unfortunately, there are instances when disconnection for nonpayment is necessary. Disconnection for nonpayment is often a difficult task. Disconnection is sometimes delayed because field representatives cannot gain access to the premises, requiring that the disconnection be rescheduled. Contacting the customer in order to gain entry for disconnection can also be difficult. Landlord- tenant relationships and the use of false customer identities can complicate and delay disconnections. Disconnections that cannot be completed only contribute to increasing bad debt expense and unrecoverable consumption which ultimately is borne by the other customers. The job of the new full time employee is to locate and contact the responsible customer party, reschedule all incomplete disconnections, make arrangements for entry into the premises and minimize the number of incomplete disconnections. Adding a person to administer the incomplete process of disconnection at the meter helps avoid the more expensive alternative of digging up the service line and installing a valve. In addition, this option reduces bad

debt expense as well as may assist in reducing the need for a more expensive solution to the problem.

Fraud and Theft Invoice Employee. All fraud and theft billing is performed by Customer Billing. During 2006, Credit and Collections added two employees to investigate fraud and theft accounts. With two additional resources identifying fraud incidents and completing investigations, the increased volume of fraud and theft investigations has overwhelmed Customer Billing, and they are unable to bill these accounts in a timely manner. Also, most fraud and theft cases require manual bills which are labor intensive. The additional support will allow more timely billing of fraud and theft invoices and help decrease bad debt expense.

For the period January through July 2005, the total number of fraud and theft investigation orders billed was 1,451 and in 2006 was 2,794, for an increase of approximately 92%. The increased workload in this area requires the new fulltime employee. In addition, two fulltime employees are added to focus on service diversion and identity fraud cases.

Automatic Transfer Order Agreements (ATO) ATO's are typically agreements whereby nonpayment of a tenant's utility bill automatically transfers the bill into the name of the landlord. Our ATO workload has increased to the point that one new fulltime employee in this area is required. ATO contracts have increased approximately 10% overall for Vectren South and require more than one person to keep the work current. With more, large apartment owners utilizing the ATO service, the number of contracts along with the number of services covered by the contract has increased. Numerous accounts on one contract require more time to process. Initiating the ATO agreements and transferring the bill in situations of voluntary or involuntary (shut-off for non-payment) disconnection of service to the landlord provides a customer service, avoids multiple calls from individuals moving in and out of these properties, and avoids the potential for damage if service is shut-off without notifying the property owner.

Billing Quality Specialists. Because the billing function is dynamic and is required to adapt to process changes regularly, a dedicated trainer/quality assurance specialist is needed to ensure that the Billing group is operating efficiently. This additional fulltime employee is proposed to help identify root

causes of billing accuracy issues. This employee would audit our internal billing processes, detect any instances of failure to follow procedures, focus on minimizing the number of re-bills and approve the accuracy of our overall billing process. The employee will work within the billing group to ensure that billing processes and procedures are followed to ensure billing accuracy. In addition, the employee will function as Quality Specialist/Trainer with responsibilities including (1) training new hires, (2) perform personal performance audits, (3) writing and updating department processes and procedures, and (4) performing other high level tasks as assigned. The Internal Audit group has concurred that personal performance audits are essential and this position would be responsible for coordinating the audits.

Customer Accounting Analyst. This is an Analyst position for the Customer Accounting Department. This position assists with the reconciliation of billed sales and consumption and tracking key financial metrics. The analyst will also be used to validate the daily and monthly balancing for the Gas Transportation Billing group. Currently there are no validation procedures performed outside of Gas Transportation for reports sent to financial accounting. This is necessary to validate the Gas Transportation financial information. The analyst will also be responsible for generating customer billing determinants.

Billing Specialist or Coordinator. An employee is needed to provide support to the Billing Department and assist with maintaining Department performance levels. This employee will be responsible for developing and maintaining Department tracking spreadsheets; monitor, report, and present monthly billing issues to management; serve as a single point of contact for billing accuracy issues; review and monitor revenue and consumption adjustment reports; assist with development of department training documents; process requests for complex billing adjustments; assist in the ongoing analysis of Billing Department process and procedures; and perform other billing tasks as needed.

Large Customer Billing. One fulltime Gas Transportation Coordinator is needed to administer large customer billing. This position will oversee gas transportation programs, be responsible for daily nominating confirmation with pipelines, understand and manage gas tariffs and special contract rates, manage bill delivery variances and resolve and address daily and monthly imbalance issues,

marketer communication, coordination and assignment of pipeline capacity, follow up on contract administration and perform other duties. The complexity of billing functions for gas transportation customers and marketers, and the numbers of gas transportation customers, has increased. This position is necessary for the proper administration of large customer billing. To administer these needs of large customer billing, an additional employee is needed.

Gas Transportation Coordinators. Vectren South will hire two gas transportation coordinators to perform billing functions for gas transportation customers and marketers. The growing complexity of gas transportation and the number of gas transportation customers requires these additional personnel. They are needed to help perform the billing function for gas transportation customers and marketers. They are needed to perform daily nomination confirmation with pipelines and manage Vectren's marketer extranet site. They are needed to help manage and build delivery variances and resolve and address daily and monthly imbalance issues. These two employees were hired after the close of the test year.

Gas Transportation Program Administrator. Vectren South is realigning its Gas Transportation Department organization and this year will hire one Gas Transportation Program Administrator to oversee the management and administration of Vectren's large volume gas transportation programs. This includes management of broker, marketer supplier relationships and contracts, daily gas transport nomination, and supplier procedures and policies, balancing, curtailment, flow restriction policy and procedures, new tariff implementations, and acts as a liaison with other company departments to ensure operating activities are fulfilled efficiently and working relationships necessary for tariff requirements and customer contracts are satisfied.

**Q. Is it reasonable and necessary for Vectren South to employ these additional personnel?**

A. Yes. For Vectren to fulfill the growing responsibilities in the area of gas customer billing in a timely and efficient manor and assure quality in performing this function, it is necessary to hire these additional employees and allocate an appropriate portion to Vectren South.

**Q. What is the total expense associated with the additional billing personnel described above?**

A. The annual additional expense for Vectren South is $80,985 as included in Petitioner's Exhibit MSH-2 Adjustment A15, Line 21.

## VIII.
## Utility Plant in Service

**Q. Please describe Vectren South's gas facilities that are used in connection with the provision of service to the public.**

A. Vectren South's gas system facilities at March 31, 2006, consisted of approximately 3169 miles of mains and 112,460 service lines. There are numerous measurement and regulation stations, more than 123,000 meters of various sizes, buildings and other plant, three gas storage fields, gas in storage, fleet vehicles, and various other items of property commonly used in the industry such as land, easements, materials, supplies and working capital.

**Q. Please describe the overall condition of Vectren South's utility plant.**

A. I am personally familiar with the property, particularly the larger items. In my opinion, the property is well maintained, in good condition, and is reasonably necessary for Vectren South's provision of gas utility service in it service area.

**Q. What procedures are in place to ensure that the amount reflected as utility plant in service as of March 31, 2006 on Vectren South's books and records represents the actual cost of utility plant in service as of that date?**

A. Vectren South maintains continuing property records based on a capital work order procedure. Capital projects must be authorized by management before any costs are incurred and construction begins. Capital investment is also controlled by an investment budget schedule approved and maintained by the Company's officers and Board of Directors. The construction work order procedure assures that the cost of new construction is not transferred to utility plant in service until verification that the work is completed and in service. This

verification is accomplished when field operating personnel submit to plant accounting a report listing the actual quantities of the property units installed. Similarly, Vectren South has a retirement work order procedure that assures property is removed from utility plant in service when the plant accounting department, upon receipt from field operations, processes documentation that the retirement work is completed.

**Q. Have you reviewed the current calculation for Vectren South-Gas' Rate Base?**

A. Yes. Petitioner's Exhibit WSD–4 demonstrates that Vectren South-Gas' Total Rate Base as of March 31, 2006 is $118,480,432.

**Q. How does the current plant in service compare to the plant in service at the time of Vectren South-Gas' last rate case?**

A. Petitioner's Exhibit WSD–5 demonstrates that since December 31, 2002, Vectren South-Gas' plant in service has increased by $5,692,432. This change has been primarily driven by increases in facilities required to serve new customers, the replacement of exiting facilities to ensure the continued provision of reliable service to existing customers, and the installation of system enhancements to ensure capacity for increasing customer loads and to ensure ongoing service quality and reliability.

**Q. Does this conclude your testimony?**

A. Yes.

**Energy Delivery Adjustments to Test Year Spending Level - Evansville Region - Gas**

| Project Name | Adjustment | FERC | Gas - Allocated | Detailed Description |
|---|---|---|---|---|
| **Aging Workforce:** | | | $ 430,411 | |
| Apprentice Training - 9 Fitters | A16 | 880 | $ 3,030 | Apprentice Training 2 Fitters @ $1515 per Fitter. |
| Training Manager | A16 | 880 | $ 12,517 | Hire a Manager of Training to develop strategic training plan for all electric training with associated safety training. Has ownership over develop of training plan, employee progression, record keeping; $79.6K (plus loadings) allocated among all companies and products |
| OQ Testing - 9 Fitters | A16 | 880 | $ 3,030 | OQ Testing 2 Fitters @ $1515 per Fitter. |
| Hire 2 approved Fitters | A16 | 887 | $ 24,751 | 2 Fitters @ 70% O & M loaded ( 75% Distr, 25% Transm; 50% Oper=Leak Surveys and Critial Valve Insp, 50% Mtce=50%), $14.29/hour first six months, $15.60/hour second six months |
| | A16 | 863 | $ 8,250 | |
| | A16 | 874 | $ 24,751 | |
| Reduction Due to Retirements | A16 | 887 | $ (17,249) | Planned retirements (based on age 62) removed from the test year; based on salary and loadings; detail available in the aging workforce proforma support papers; $20.83/hour for fully trained fitters |
| | A16 | 863 | $ (5,750) | |
| Supervisor Retirement Impact | A16 | 850/870 | $ 28,611 | |
| Engineering Co-op Program | A16 | 850/870 | $ 8,901 | Implement an engineering co-op program including 3 gas co-ops during each semester; $23K/co-op (loaded at 59%) 30% O&M allocated between companies based on customer strategy (43% gas) |
| Contract Labor for 6 fitters to perform work until the apprentices are fully qualified. | A16 | 887 | $ 43,778 | *Costs to initiate and maintain reliability and maintenance programs until newly* hired fitters are qualified. 70% O&M at $44.26/hour with each contract fitter working 1880 hours annually. ( 75% Distr, 25% Transm; 50% Oper=Leak Surveys and Critical Valve |
| | A16 | 863 | $ 14,593 | |
| | A16 | 874 | $ 43,778 | |
| HR - Retirement education and Planning | A16 | 923 | $ 10,560 | Prepare, provide information, and educate substantial portions of the workforce to transition to retirement. Subject matter will include financial planning, insurance issues, and health care concerns. Assume annually 200 participants initially at $250 each (10.56% to VEDS Gas) |
| HR - Safety and Training Employee Relations Consultant | A16 | 923 | $ 64,045 | Support and ensure regulatory compliance with mandatory safety training, safe operating procedures, new hire safety orientation and accomplishing corporate goal of Best in Class safety performance. (50% to VEDS Gas) |
| HR - Safety projects and implementation | A16 | 923 | $ 87,500 | Annual funding to ensure compliance and education of new employees and projects. Expanded apprentice programs, testing, OSHA and DOT requirements. (50% to VEDS Gas) |
| HR - Recruiting and Employment | A16 | 923 | $ 13,200 | Replacing retirements that are anticipated to grow at 3x of current rate. Additional use of search firms to recruit. (10.56% to VEDS Gas) |
| HR - Diversity | A16 | 923 | $ 15,840 | Hiring opportunities resulting from aging workforce present hiring opportunities to diversify the workforce. Will need recruiting assistance from search firms. (10.56% to VEDS Gas) |
| HR - Training | A16 | 923 | $ 26,400 | Additional training programs and consulting support to develop and administer training requirements for new members of workforce. (10.56% to VEDS Gas) |
| HR - Specialist-Recruiting and Employment | A16 | 923 | $ 5,037 | Anticipated increased recruiting and hiring due to the aging workforce will required support for the Employment Recruiter. (10.56% to VEDS Gas) |
| HR - Specialist-Training | A16 | 923 | $ 5,037 | Incremental headcount to administer increased training requirements of new hires and those in new roles. (10.56% to VEDS Gas) |
| HR Generalist Support of Workforce Transformation | A16 | 923 | $ 9,957 | New employees and transformational issues will increase the need for HR expertise and support of change activities. (10.56% to VEDS Gas) |

**Vectren Energy South - Gas**
**Aging Workforce**
**Test Year Ended March 31, 2006**

# VEDS Energy Delivery - Bargaining-Unit Workforce

Retirement Schedule Based-On Age 62

| Job Classification | # of Active BU Employees as of 6/23/06 | 2007 Planned Hires associated with the Aging Workforce Issue | | # Likely to Retire ( Age > 62 ) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 2007 - 2010 | | 2011 - 2014 | | 2015 - 2018 | | 2019 - 2022 | | 2023 - 2026 | |
| | | Planned 2007-2010 Replacements | Apprenticeship Attrition Allowance | # Retiring | % | # Retiring | % | # Retiring | % | # Retiring | % | # Retiring | % |
| Attendant.Utility | 14 | | | 2 | 14% | 1 | 7% | 4 | 29% | 5 | 36% | 2 | 14% |
| Cable Splicer. | 3 | | | 0 | 0% | 0 | 0% | 1 | 33% | 0 | 0% | 1 | 33% |
| Collector. | 2 | | | 0 | 0% | 0 | 0% | 0 | 0% | 0 | 0% | 1 | 50% |
| Electrician. | 16 | 2 | N/A | 1 | 6% | 1 | 6% | 6 | 38% | 4 | 25% | 3 | 19% |
| Fitter. | 36 | 2 | N/A | 0 | 0% | 2 | 6% | 10 | 28% | 5 | 14% | 11 | 31% |
| Ground Utility Attendant. | 3 | | | 0 | 0% | 0 | 0% | 1 | 33% | 0 | 0% | 0 | 0% |
| Janitor. | 1 | | | 0 | 0% | 1 | 100% | 0 | 0% | 0 | 0% | 0 | 0% |
| Lead.Construction/Maintenance | 2 | | | 1 | 50% | 0 | 0% | 0 | 0% | 0 | 0% | 1 | 50% |
| Line Clearance Specialist. | 2 | | | 0 | 0% | 0 | 0% | 0 | 0% | 0 | 0% | 2 | 100% |
| Line Specialist.1st Class | 53 | 8 | 5 | 7 | 13% | 6 | 11% | 9 | 17% | 13 | 25% | 10 | 19% |
| Master Mechanic. | 10 | | | 0 | 0% | 2 | 20% | 2 | 20% | 2 | 20% | 3 | 30% |
| Material Specialist Helper.1st Six Mo | 1 | | | 0 | 0% | 0 | 0% | 0 | 0% | 1 | 100% | 0 | 0% |
| Meter Mechanic. | 1 | | | 0 | 0% | 1 | 100% | 0 | 0% | 0 | 0% | 0 | 0% |
| Meter Prover. | 1 | | | 0 | 0% | 0 | 0% | 0 | 0% | 0 | 0% | 0 | 0% |
| Meter Reader Collector. | 3 | | | 0 | 0% | 0 | 0% | 1 | 33% | 1 | 33% | 1 | 33% |
| Meter Reader. | 9 | | | 0 | 0% | 0 | 0% | 3 | 33% | 4 | 44% | 2 | 22% |
| Meter Specialist. | 5 | | | 0 | 0% | 1 | 20% | 2 | 40% | 0 | 0% | 2 | 40% |
| Specialist.General Repair | 1 | | | 1 | 100% | 0 | 0% | 0 | 0% | 0 | 0% | 0 | 0% |
| Specialist.Material | 7 | | | 1 | 14% | 2 | 29% | 3 | 43% | 1 | 14% | 0 | 0% |
| Specialist.Service | 3 | | | 0 | 0% | 0 | 0% | 1 | 33% | 2 | 67% | 0 | 0% |
| Specialist.Trouble | 10 | | | 1 | 10% | 2 | 20% | 3 | 30% | 1 | 10% | 3 | 30% |
| Technician Corrosion. | 2 | | | 0 | 0% | 2 | 100% | 0 | 0% | 0 | 0% | 0 | 0% |
| Technician Service. | 4 | | | 1 | 25% | 2 | 50% | 1 | 25% | 0 | 0% | 0 | 0% |
| **All VEDS Energy Delivery BU Retirements** | **189** | **12** | **5** | **15** | **8%** | **23** | **12%** | **47** | **25%** | **39** | **21%** | **42** | **22%** |

**Note: The highlighted Bargaining Unit Job Classifications and all Non-Bargianing Unit Supervisors are considered in the Aging Workforce Proforma**

Petitioner's Exhibit No. WSD-3
Vectren South-Gas
Page 1 of 1

**VECTREN SOUTH**
**GAS TARIFF**
Statement of Gas Property
Original Cost Ratebase at March 31, 2006

| Line No. | Activity (FERC) No. | Description | Gas Plant Per Books at March 31, 2006 | Eliminations | As Adjusted Rate Base at March 31, 2006 |
|---|---|---|---|---|---|
| | | Utility Plant | | | |
| 1 | 101 | In Service - Unitized | $ 176,967,759 | $ - | $ 176,967,759 |
| 2 | 105 | Property Held for Future Use | - | - | |
| 3 | 106 | Completed Const. Not Classified | 14,162,771 | - | 14,162,771 |
| 4 | 107 | Const. Work in Progress | 3,721,150 | (3,721,150) | - |
| 5 | | Gross Utility Plant | $ 194,851,680 | $ (3,721,150) | $ 191,130,530 |
| | | Accumulated Depreciation | | | |
| 6 | 108 | Utility Plant | $ (80,229,095) | $ - | $ (80,229,095) |
| 7 | | Net Utility Plant (Line 5 + Line 6) | $ 114,622,585 | $ (3,721,150) | $ 110,901,435 |
| | | Material & Supplies (13 Month Average) | | | |
| 8 | 154 | Utility Material & Supplies | $ 605,003 | $ - | $ 605,003 |
| 9 | 163 | Stores Expense | 402,626 | - | 402,626 |
| 10 | 164 | Gas in Underground Storage | 6,571,368 | - | 6,571,368 |
| 11 | | Total Material & Supplies | $ 7,578,997 | $ - | $ 7,578,997 |
| **12** | | **Total Rate Base (Line 7 + Line 11)** | **$ 122,201,582** | **$ (3,721,150)** | **$ 118,480,432** |

**VECTREN SOUTH**
**GAS TARIFF**
**RATE BASE CHANGE - 12/31/02 TO 3/31/06**

| Line No. | Utility Plant | December 31, 2002 | March 31, 2006 | Increase/(Decrease) |
|---|---|---|---|---|
| 1 | Intangible Plant | $ 10,508 | $ 10,508 | $ - |
| 2 | Natural Gas Production Plant | 54,245 | 54,245 | - |
| 3 | Underground Storage Plant | 12,460,604 | 12,529,653 | 69,049 |
| 4 | Transmission Plant | 26,523,882 | 29,481,261 | 2,957,380 |
| 5 | Distribution Plant | 120,399,941 | 137,230,209 | 16,830,269 |
| 6 | General Plant | 6,561,836 | 7,342,128 | 780,292 |
| 7 | General Plant - Common | 5,826,912 | 4,482,525 | (1,344,386) |
| 8 | Gross Utility Plant | $ 171,837,926 | $ 191,130,530 | $ 19,292,604 |
| 9 | Total Gas Depreciation Reserve | $ 66,306,704 | $ 78,309,736 | $ 12,003,032 |
| 10 | Total Common Depreciation Reserve | 2,131,223 | 1,919,359 | (211,864) |
| 11 | Total Depreciation Reserve | $ 68,437,927 | $ 80,229,095 | $ 11,791,168 |
| 12 | Net Utility Plant (Line 8 - Line 11) | $ 103,400,000 | $ 110,901,435 | $ 7,501,435 |
| | **Other Rate Base Components** | | | |
| 13 | Material and Supplies | $ 500,000 | $ 605,003 | $ 105,003 |
| 14 | Underground Storage & Gas Inventory | 8,888,000 | 6,571,368 | (2,316,632) |
| 15 | Stores Expense | | 402,626 | 402,626 |
| 16 | Common Applicable to Gas | | | - |
| 17 | Total Other Rate Base Components | $ 9,388,000 | $ 7,578,997 | $ (1,809,003) |
| **18** | **Total Rate Base (Line 12 + Line 17)** | **$ 112,788,000** | **$ 118,480,432** | **$ 5,692,432** |

**SOUTHERN INDIANA GAS AND ELECTRIC COMPANY**
**D/B/A VECTREN ENERGY DELIVERY OF INDIANA, INC.**
**(VECTREN SOUTH – GAS)**

**IURC CAUSE NO. 43112**

**DIRECT TESTIMONY**
**OF**
**JAMES M. FRANCIS**
**DIRECTOR OF TECHNICAL SERVICES**

**ON**

# THE BARE STEEL AND CAST IRON REPLACEMENT PROGRAM AND INTEGRITY MANAGEMENT PROGRAM EXPENSES INCURRED TO DATE AND PROJECTED

**SPONSORING PETITIONER'S EXHIBITS JMF-1 THROUGH JMF-14**

**Direct Testimony of James M. Francis**

**Q. Please state your name, business address and occupation.**

A. My name is James M. Francis. My address is One Vectren Square, Evansville, Indiana, and I am Director of Technical Services for Vectren Utility Holdings, Inc. ("VUHI"), the parent company of Southern Indiana Gas and Electric Company, Inc. d/b/a Vectren Energy Delivery of Indiana, Inc. ("Vectren South" or "the Company").

**Q. What are your duties in your present position?**

A. I have responsibility for engineering and technical support for Vectren South utility operations. My specific responsibilities include Measurement, System Design and Planning, Engineering Systems Support, Corrosion Control, Project Engineering, Compliance, Standards, Technical Training and Operator Qualification, Land Services, Liquid Propane and Underground Storage, Pipeline Integrity Management, and Capital Planning and Management. Additionally, I am responsible for identifying and implementing many of Vectren South's asset management programs.

**Q. Please describe your work experience.**

A. I have been employed by Vectren South since April 8, 2004 when I became the Director of Technical Services. Prior to my current position, I was employed with Vectren Energy Delivery of Ohio ("Vectren Ohio") since its purchase of the gas assets of the Dayton Power & Light Company in 2000. Most recently, I was the Regional Manager of the Troy Operating Region with responsibility for field operations. I also held other positions at Vectren Ohio including Planning Manager and Measurement Supervisor. Prior to my employment with Vectren, in 1991, I became an employee of Dayton Power & Light, serving as a Project Engineer, System Planner and Measurement Supervisor.

**Q. What is your educational background?**

A. I received a Bachelor of Science in mechanical engineering from the University of Dayton in 1993. I received a Masters in Business Administration from The Ohio State University in 2000.

**Q. Are you involved in any gas industry association activities?**

A. Yes. I am active in the American Gas Association's ("AGA") Operating Section. I am currently a member of the AGA's Distribution and Transmission Engineering Committee. I am also a member of two Indiana Energy Association committees. I am an active member of the Distribution Integrity Management Steering Group ("DIMSG") which is coordinated through the AGA.

**Q. Have you previously testified before this Commission?**

A. Yes. I have provided testimony in support of the recovery of Pipeline Safety expenses for both Vectren South and Vectren North.

**Q. What is the purpose of your testimony in this proceeding?**

A. The purpose of my testimony is threefold. First, I will provide an explanation of a proposed bare steel and cast iron pipeline replacement program ("Program") for Vectren South. I will provide a general history on the use of bare steel and cast iron mains in the natural gas utility industry and discuss Vectren South's current situation. I will provide some comparative data between Vectren South and industry peers regarding the amount of remaining bare steel and cast iron pipelines as well as pipeline condition based information such as leak performance. I will provide some information on recent industry practices relative to similar replacement programs. I will identify the capital requirements for the Program and will discuss the benefits of pursuing the Program. Finally, I will discuss generally how Vectren South will manage the Program.

The second portion of my testimony will provide a description of the incremental work performed by Vectren South under its Integrity Management Program to meet the requirements of the Pipeline Safety Improvement Act of 2002 ("Safety Act") and the subsequent Federal Department of Transportation Integrity

Management rulemaking pursuant to the Safety Act ("DOT Rule"). I will quantify the incremental Program expenses that Vectren South has prudently incurred for the period between April 1, 2005 through March 31, 2006 as a result of the Safety Act and the DOT Rule. These types of expenses were authorized for recovery by the Commission in its Order in Cause No. 42596. I will also provide an estimate of incremental expenses expected to be incurred from April 1, 2006 through March 31, 2007 associated with Vectren South's Integrity Management activities.

**Q. What Exhibits are you sponsoring in this proceeding?**

A. I am sponsoring the following exhibits:

- JMF-2- Vectren South Distribution Pipeline Mileage by Material Type
- JMF-3-DOT Annual Report Distribution Main Mileage Summary.
- JMF-4-Main Leakage Rates
- JMF-5- Leakage Rate Comparison
- JMF-6-Bare Steel and Cast Iron Leak Repairs by Hazard and by Class
- JMF-7-Utilities with Similar Replacement Programs
- JMF-8-Vectren South Estimated Capital Requirements
- JMF-9-Independent Review of Cast Iron and Bare Steel Pipe Replacement Program
- JMF-10- Vectren South Potential Maintenance Expense Reduction
- JMF-11- Pipeline Safety Act – Actual Deferred Expenses April 1, 2005 – March 31, 2006
- JMF-12 2005 Integrity Management Program Expenses by Work Category
- JMF-13- 2005 Integrity Management Program Estimate compared to Period Ending March 31, 2006 Actuals
- JMF-14- Integrity Management Program Estimate for Period April 1, 2006 through March 31, 2007

**Q. How is your testimony organized?**

A. My testimony is organized in two sections:

I. Bare Steel and Cast Iron Replacement Program

II. Integrity Management Program Expenses Incurred To Date And Projected

## I. Bare Steel and Cast Iron Replacement Program History

**Q. Please provide an overview of the history of the use of bare steel and cast iron mains in the natural gas utility industry within the United States.**

A. When natural gas distribution systems originated in the 1800's, the majority of the pipelines were constructed of cast iron. In the 1920's, local distribution companies ("LDCs") transitioned to using bare steel pipelines because of the superior joining methods through welding, although there were other methods of joining such as coupling and screw fittings. During the Great Depression and World War II, LDCs reverted to using cast iron distribution mains more often when steel supplies became scarce and as steel transmission pipelines began their expanse across the continental United States. Installation of new cast iron mains was generally non-existent after the 1940's when steel pipelines became the material of choice from the 1950's into the 1970's, until the introduction of plastic pipelines. In the 1950's transitioning from bare steel pipelines to coated steel pipelines began to occur, although bare steel was allowed for use until 1971. In 1971, the Department of Transportation (DOT) introduced the original minimum safety standards, Title 49 Code of Federal Regulations Part 192, stipulating the materials approved for use in natural gas transmission and distribution systems. The regulations eliminated cast iron and bare steel mains and fittings from the approved materials list for construction of new distribution systems.

**Q. Please describe how the use of different pipe materials evolved in the Vectren South system.**

A. Vectren South's predecessor companies used different pipe materials in their distribution systems. In the immediate area of Evansville, cast iron mains were used to distribute manufactured gas to its first streetlights as early as 1853. Cast iron mains were the distribution pipe of choice into the 1950's, at which time there was a transition to bare steel mains. The earliest known cast iron main still in service in the Vectren South system dates to 1899. Bare steel mains were

used extensively until 1965 when the company transitioned to wrapped coating on steel mains. In and around the towns of Washington and Vincennes, bare steel construction was prevalent during the early development of gas distribution systems in those areas. In 1962, the Company transitioned from using exclusively bare steel main to using wrapped steel mains.

**Q. How many miles of bare steel and cast iron mains remain in service?**

A. As of the end of 2005, there were 119 miles of bare steel and 160 miles of cast iron mains throughout the Vectren South territory. The majority of these pipelines reside within more heavily populated areas of Evansville, Washington and Vincennes.

**Current System**

**Q. What percentage of Vectren South's distribution mains is bare steel and cast iron?**

A. As of the end of 2005, Vectren South had a total of 3032 miles of distribution main. Bare steel is approximately 4% of the total mileage and cast iron is approximately 5.3%.

**Q. At what rate is Vectren South currently replacing its bare steel and cast iron mains and how does this rate compare to others in the industry?**

A. During the past five years Vectren South has replaced an average of nearly three miles of bare steel and four miles of cast iron main annually. Petitioner's Exhibit No. JMF–2 shows in detail how Vectren South's bare steel and cast iron mains inventory has changed since 2000. This replacement rate, if continued, would result in the replacement of the remaining bare steel and cast iron mains in about 40 years or an annual replacement rate of 2.5%. This compares to the three year industry average bare steel and cast iron replacement rate of 4.8%, as reported annually to the Department of Transportation ("DOT"). Petitioner's Exhibit No. JMF-3 provides a summary of the industry data derived from the annual DOT reports of all natural gas utilities in the United States.

**Q. How does Vectren South's gas distribution system compare to those of other gas utilities?**

A. As of 2005, the industry average percentage of bare steel mileage to total mileage is 4.7% compared to 3.9% of the Vectren South system, while the percentage of cast iron mileage to total mileage is 3.4% compared to 5.3% of the Vectren South system. This includes all entities who report information to the DOT. Petitioner's Exhibit No. JMF–3 provides a comparison of Vectren South to the industry averages.

**Pipe Condition/Leaks**

**Q. What operational issues result from continued use of bare steel and cast iron mains?**

A. Cast iron mains have more failure modes for leaks as compared to other pipe materials. Cast iron pipe sections are joined together using couplings or bell and spigot joints, increasing the pipe's susceptibility to pulling apart or separating at the joints given outside forces – tree roots, excavating activity around the main, freeze/thaw or simply decay of the compression fitting material over time in the bell and spigot joints. Cast iron mains have neither coating nor utilize cathodic protection systems, and therefore, are prone to corrosion in the form of graphitization. The manufacturing process used to create cast iron pipe produced a brittle material that is susceptible to circumferential and longitudinal fractures. Elevated natural gas system pressures also contribute to greater hoop stresses on the interior diameter of the cast iron mains leading to fractures at weak points in the pipe walls. The brittleness and susceptibility to cracking of the cast iron material make it more difficult to maintain than steel or plastic pipe, making repair or replacement sometimes very challenging and costly. Extra care is needed particularly during excavation and backfill to avoid unintended damage. Cast iron mains are particularly susceptible to damage when there is active construction work in their vicinity. This becomes a particular problem when road construction occurs. A road construction crew may damage a cast iron pipeline by simply working around it, and a utility may not discover that a leak has occurred until well after the work has been completed. Vectren South, and contractor crews hired by Vectren South, are very aware of the special

precautions, such as support and blocking, that are necessary to protect a cast iron main while working around it with heavy equipment.

Bare steel provided some benefit over cast iron in that it allowed for a more permanent joining method of welding, when utilized. Alternative joining methods for mains, such as threaded or compression coupled connections, were also used as they enabled time and cost savings in the installation process since the skilled labor of a welder was not required. However, because these pipelines do not have coating and are not cathodically protected, corrosion on these pipe systems has become a problem over time. In addition to the corrosion driven leakage, material failures as a result aging and the absence of coating or cathodic protection have led to a significant amount of leakage. These failures occur on various components of the system such as service tees, valves, couplings, and bell and spigot joints. Corrosion and material defects account for approximately 90% of all Vectren South's below ground bare steel and cast iron leaks repaired since 2003.

**Q. Is there a difference in the operational performance of bare steel and cast iron mains from that of protected steel or plastic mains?**

A. Yes. Bare steel and cast iron mains have significantly higher leakage rates than do protected steel and plastic mains. This leads to higher operating and maintenance expenses, greater line losses and safety and reliability risks. Vectren South's 2005 leakage rate, which Vectren South defines as the number of main leaks repaired per mile of main, caused by corrosion, material defects, natural forces or other, for the various material types is as follows: Bare Steel – 1.45, Cast Iron - 0.34, Protected Steel - 0.14, and Plastic - 0.02. Petitioner's Exhibit No. JMF – 4 charts the leakage rate for Vectren South from 2003 through 2005.

The repaired leakage information is only one indicator of the operational performance. New leaks found each year either contribute to the leaks repaired or are managed as active, open leaks. Throughout 2005, Vectren South identified 2,028 new leaks, 730 of which are estimated to be on a bare steel main

or service or a cast iron main. Additionally, Vectren South typically monitors a level of minor, non-threatening leaks and manages those through standard industry leak management practices. At the end of 2005, Vectren South had 1,236 active, open leaks remaining in its system. Often for a specific leak, particularly if the cause was corrosion, the severity of the leakage will change over time and progress from a minor leak, a class 3 leak, to a leak in need of repair, either a class 2 or class 1 leak.

**Q. How does Vectren South's leakage rate compare to those of other utilities?**

A. Leakage rates as reported to the DOT can only be defined in totals as the DOT reports are not specific to leakage by material type, although the physical makeup of a company's system is an indicator. The leakage data is broken out by cause category. Assuming only leaks with corrosion, material defect or welds, natural forces, or other listed as causes are included in the calculation, Vectren South's leakage rate per mile of bare steel and cast iron was 5.46 in 2005. The utility Industry average was 3.34. The total leakage rate, including all leaks and total miles of main for Vectren South was 0.64 compared to the Industry average of 0.45 in 2005. Petitioner's Exhibit No. JMF-5 charts some comparative leakage rates between Vectren South and Industry averages.

**Q. Does the increased likelihood of leakage on a bare steel or cast iron main create potentially serious issues for Vectren South and its customers?**

A. When considering only those leaks repaired since 2003 that are directly attributable to bare steel or cast iron mains, 21% of those leaks were identified as being hazardous to public or employee safety, requiring immediate repair. Petitioner's Exhibit No. JMF–6 provides a count of the leaks repaired by hazard type. To date, Vectren South has not had any serious personal injury or property damage incidents related to such pipes. However, as these pipes age, the leakage rates will only continue to worsen. As we gradually replace these pipes over time, we still have many miles of pipe that drive higher maintenance costs, and pose a threat to reliable service and public safety. Ultimately, the bare steel and cast iron mains must be replaced by better materials and technology. Recognizing this situation, we have conducted an analysis of our system,

considered current industry practice, reviewed recent DOT initiatives in terms of integrity improvements, and designed a proposed replacement program that will cost effectively address this issue and provide our customers with better service.

**Q. Have other utilities implemented or proposed similar replacement programs?**

A. Yes. Vectren South is aware of several other companies who have completed, implemented or proposed a similar replacement program. These companies are identified in Petitioner's Exhibit No. JMF-7. Elizabethtown Gas just received approval of cost recovery associated with its Pipeline Replacement Program from the New Jersey Board of Public Utilities on August 18, 2006. In a recent study conducted by the American Gas Foundation on the integrity of natural gas distribution systems, 17 of 23 companies surveyed have a formal program for the replacement of bare steel, cast iron and/or even some types of plastic pipe. The study concluded that there has been an increase in the number of proactive replacement programs in the gas industry.

**Replacement Program**

**Q. How does Vectren South propose to structure the Program?**

A. Vectren South is proposing to replace all of its remaining bare steel and cast iron infrastructure over a 20 year period. The Program will target the poorest performing mains or those pipe segments identified as being the highest risk when possible, but will in general plan the replacement to optimize the capital spend, minimize the inconvenience to customers and our communities while improving the reliability and safety of our systems. The Program will generally target the replacement of larger sections of main which will allow for an increase in system pressures while minimizing material costs. When possible, we will coordinate construction activities with public improvement projects to minimize inconveniences to property owners as well as take advantage of synergies gained through less surface restoration.

**Q. What is the capital requirement associated with Vectren South's Program?**

A. In 2006 dollars, the expected Program cost is approximately $90,000,000, or an annual capital requirement of approximately $4,500,000 over a 20 year period. Petitioner's Exhibit No. JMF – 8 details the expected annual and total capital requirement. Program costs are based on historical costs per mile of main replaced ($45.00 per foot) during the last three years on projects throughout Vectren's North and South territories. The costs may vary from year to year depending on the project sizes and changes in the availability and cost of labor, equipment and materials over the next 20 years. Based on potential economies of scale that may result from larger planned replacement projects performed as part of this program, it is possible that Vectren South's costs may be less that these estimates.

**Q. What has Vectren South done to ensure that the proposed Program is prudent?**

A. Vectren South has had discussions with industry peers from Duke Ohio (formerly known as Cincinnati Gas & Electric Company), AmerenUE, and the American Gas Association to identify and study similarly purposed programs as well as to identify pertinent information that would help substantiate our program. Research into recently performed studies, such as the American Gas Foundation's study on the integrity of natural gas distribution systems as well as participation in the industry organizations assisting in the development of forthcoming Distribution Integrity Management rules, has provided Vectren South with a considerable amount of supportive information. Vectren South also engaged Stone & Webster Management Consultants Inc., a division of the Shaw Group ("Stone & Webster"), to perform an independent review of Vectren South's distribution system and performance history. Stone & Webster used our existing pipeline data and performance history to complete a review of the Program. They provided analysis and observations of trends that are occurring in the industry and provided some comparative analysis of Vectren South's system against the industry in general.

**Q. How did Vectren South choose Stone & Webster to perform this study?**

A. Based on Stone & Webster's knowledge of the industry, their practical experience in performing such an analysis (they completed a similar analysis of the Duke Energy Ohio system for their accelerated replacement program in the late 1990's), as well as their understanding of the issues associated with bare steel and cast iron mains, Vectren South concluded that Stone & Webster was best suited to complete the analysis.

**Q. What conclusion did Stone & Webster reach as a result of their independent analysis of Vectren South's distribution system?**

A. After reviewing our pipeline data and leak history, as well as conducting industry research and drawing on their extensive experience and knowledge of the issues that generally exist with bare steel and cast iron mains, Stone & Webster recommended that Vectren South pursue the Program. Specifically their conclusions point to many of the issues created by bare steel and cast iron mains, of which the significant differences in leakage rates, compared to protected steel and plastic mains, is a significant factor supporting an expedited replacement program. While a relatively small portion of the distribution system infrastructure, bare steel and cast iron accounted for 61% of the total leakage repairs included in their study. Petitioner's Exhibit No. JMF-9 is the Stone & Webster report.

**Program Benefits**

**Q. Why does Vectren South believe it is prudent to pursue the Program at this time?**

A. There are numerous benefits to the Program beyond the replacement of our most aged assets. First, the Program will replace the pipes that contribute most to system leaks. The resulting benefits to service reliability and safety are clear. Second, from a workforce efficiency standpoint, replacing this pipe based on a planned schedule versus smaller projects to remediate leaks will be beneficial, especially as we address the loss of more experienced employees associated with the aging workforce. There should also be some significant benefits relative to the optimization of our capital spending. This Program to replace leak prone materials will also improve customer satisfaction as leaks and outages are

avoided. Once underway, as we retire leaking pipes we will be able to reduce maintenance expenses. Over time, we expect the Program to contribute to a reduced lost and unaccounted for gas percentage. As the Program will be extensive, we also believe that there will be long term benefits to those communities impacted by the replacements. Finally, there will be benefits associated with improving this part of the system at the same time as the anticipated Federal Distribution Integrity Management Program ("DIMP") requirements.

**Q. How does Vectren South believe this Program will impact its workforce?**

A. Like many utilities in the industry, Vectren South currently faces the challenges of an aging workforce. Work associated with poor conditioned mains is typically very demanding. An aging workforce is much more challenged to complete this work without injury. However, this work is also typically more complex than when working with other materials such as plastic and requires seasoned skills and knowledge. By replacing the mains that cause much of the unscheduled activities, such as leak repairs, we will eliminate the primary sources of this work and thus have the opportunity to redirect our internal resources to other activities. And, as our experienced workforce exits and new employees are hired to take its place, the reduction in the variety of materials to be worked on will simplify future job requirements which should impact training and qualification needs.

**Q. How will the Program allow Vectren South to improve its use of financial capital?**

A. Whether we pursue this Program or continue with our current rate of replacement, all of these mains and services will eventually be replaced. The current rate and cost of replacement is a result of the combination of planned replacement projects and unplanned projects. Generally, the unplanned replacement projects are short segments to complete specific leak repairs. These shorter projects (less than 300') are more costly per foot of main installed than larger-scale projects. The blend of planned and unplanned projects yields a fairly consistent overall average cost per foot which was used as a basis for establishing the Program costs. The Program will reduce and eventually

eliminate the shorter unplanned replacement projects and will minimize our longer term capital needs. The Program presents a tremendous opportunity for improved capital utilization for a number of reasons. By increasing the average size of the projects, we will improve our average installed cost per foot of main to replace the bare steel and cast iron facilities. Our contract resources will be able to generate some economies of scale which will allow us to see reduced labor costs versus what we typically see today as a result of smaller replacement projects. Most of the bare steel and cast iron mains are operating at a standard operating pressure of approximately ¼ pounds per square inch ("psi"). Given the lower operating pressures, this requires main sizes to be larger than if designed to operate at elevated pressures, which is typical of newer distribution systems. The larger projects will allow us to install smaller diameter mains, which are less costly from both a material and labor perspective and allow us to operate the distribution systems at higher pressures, which in turn will also reduce the material costs associated with service line replacements for the same reasons. Higher pressure lines will also eliminate any pressure problems that result from standard pressure systems operating at too low of pressure during high demand days. While Vectren South has estimated the Program costs at historical average costs for similar work, we expect efficiencies may be offset to some extent by future increases in the cost of labor and materials or any location challenges that are presented when working in a more urban setting. Of course, absent the proposed program, cost increases will impact the cost of replacements even more since we will perform such replacement of the pipe over a longer time period.

**Q. Will the additional capital invested under the Program produce additional revenue?**

A. No. The affected mains are typically in older, well established areas of the communities we serve and are essentially saturated with customers, typically allowing no room for additional customers. Individual customer decisions to replace existing electric appliances with natural gas are always a possibility, but in and of itself, the Program is not expected to produce incremental customers or load.

**Q. How will Vectren South's customers benefit from this Program?**

A. It is not uncommon for customers who are served by bare steel or cast iron mains that operate at lower pressures (and are therefore susceptible to leakage and water infiltration problems) to experience outages or call Vectren South to investigate a gas odor, which drives a significant amount of meter order work. This type of work requires interaction of our customers with our contact center, requires customers to be at home and available for our service technicians to assess the problem, and generally causes disruption to their daily routines. By eliminating the cause of many of these events and by increasing system operating pressures, we will be able to reduce the number of asset condition related orders such as outside leak calls and no gas calls, and thus reduce the inconveniences to the customer. Additionally, by not having to work to repair the source of the problem, such as a leak repair, our customers will not be impacted by crews digging in their streets and yards.

**Q. How will the Program improve public safety?**

A. Any time there is substantial leakage there exists the possibility of an incident. Our leakage information from 2003 through 2005 indicates that 21% of the total leaks on the bare steel and cast iron mains resulted in a potentially hazardous condition. This means that gas was found in a confined space, migrating into sewers or within or near building walls, or the gas main resided under a hard surface, such as a road, and its most likely escape path would place gas near an occupied building. Additionally, 60% of all of the bare steel and cast iron leaks repaired in that same timeframe required immediate repair (class 1) or repair within 6 months of discovery (class 2). Petitioner's Exhibit No. JMF-6 provides a breakdown of the hazard and class of the bare steel and cast iron leaks repaired. The replacement of these mains would eliminate a considerable portion of Vectren South's total leakage. This is not only a benefit to public safety, but also to the safety of our employees and contractors.

Another positive impact to public safety will result from the materials used for new construction. Plastic mains will be primarily used for the new installation.

Plastic mains allow us to more easily isolate a damaged area and minimize the impact to our customers. Additionally, all replaced customer service line installations will include an excess flow valve. This is a device that will shut off the flow of gas automatically if a customer's service line is severed and experiences a significant loss of gas. This reduces the amount of gas that will be lost but also minimizes the amount of gas released, thus reducing the likelihood of an incident.

There is an additional aspect of safety that is not associated with leakage. There will be less leak repair activity thus reducing the possibility of property damages as well as people working or playing near a construction site. Vectren South does not typically experience safety incidents during its construction activity, but because of the nature of the work, it does pose a threat to public safety. Such threats are dramatically reduced when construction can be planned well in advance, as the Program contemplates.

**Q. Will the Program have any impact on unaccounted for gas?**

A. Over time we would expect to see our unaccounted for gas percentage improve, but the impact is difficult to quantify. Any time we can reduce leakage, we will reduce unaccounted for gas volumes. However, since the volume of gas lost with any given leak is not known and the lost gas is impossible to measure, reduced unaccounted for gas is more of an intuitive benefit. Any reduction in unaccounted for gas will translate to gas cost savings for sales customers and will reduce volumes retained from gas transportation customers as well.

**Q. Given the amount of additional replacement work, how will Vectren work with the impacted communities to make this effort less disruptive and of benefit to its customers in these communities?**

A. The Program will certainly have a significant impact on the communities Vectren South serves because there will be more significant construction activity. However, because we will have better long range replacement plans and will have identified opportunities to remove our pipelines from under the streets, we will be able to better coordinate our replacement strategy with the affected cities.

This will improve the cities' abilities to plan for paving restoration and sidewalk replacements. Too often, a city will repave a road only to have the utility dig into it to gain access to its cables, wires or pipes. As much as practicable, we will place our facilities in locations that will eliminate these disturbances in the future. This will further improve the positive relationships we have with our cities today. In the long term, this should result in reduced costs to the cities as well as to Vectren South. Further, rather than deal with many unscheduled leak repairs at various locations with less advance notice to the communities, we will have the opportunity to coordinate the plans and engage in larger more focused projects, expecting that we will not need to return to fix leaks, absent third party damage to the new pipe.

**Q. With all of the benefits of the Program, can you quantify any potential reduction in maintenance expenses?**

A. I can provide an approximation of costs that Vectren South has historically incurred as a result of work associated with the bare steel and cast iron mains and services and will use this as a basis to determine the potential future cost reductions. I arrived at this estimate by investigating our more recent maintenance expenses and work activities. These activities were tied to the associated costs and summed to generate a total potential cost reduction. The total expected reduction in annual maintenance expenses, once all bare steel and cast iron pipelines have been replaced, is approximately $470,000 (or $23,500 per year). Petitioner's Exhibit No. JMF-10 provides a breakdown of this estimate. Vectren South assumes that these savings will be realized linearly throughout the 20 year replacement period, and will continue to be realized for many years thereafter.

**Distribution Integrity**

**Q. Presently the Pipeline and Hazardous Materials Safety Administration ("PHMSA") is pursuing the implementation of DIMP. Could you provide a brief summary of DIMP?**

A. DIMP is a program intended to heighten the integrity of a company's distribution pipeline system. Vectren South already has an integrity management program in

place for its transmission pipelines as required by existing federal pipeline safety standards. However this addresses only a very small portion of our total pipeline system. Based upon a report generated by a joint work/study group comprised of representatives of the stakeholder public, the gas distribution pipeline industry, state pipeline safety organizations, and PHMSA, DIMP appears to be generally targeting four areas: risk assessment and mitigation, leak management, damage prevention, and excess flow valves. Risk assessment is a process of knowing your system, in detail, identifying the threats to your system and mitigating those threats. Aged assets, such as bare steel and cast iron mains and services arguably pose a higher risk and thus will require some mitigation measure. Mitigation could come in many forms, some of which will be additional maintenance activities such as leak surveys, patrols, additional communications and a number of others, including replacement. Leak management is being standardized across the industry so that the classification process is consistent and comparative analysis and performance measures can be derived and used to monitor system improvements relative to leakage. Implementing an expanded damage prevention program will likely be required. This will increase required communication and education efforts to a number of target audiences. DIMP is also likely to include more integration of our work processes, particularly with our locating activities, as we'll have more timely identification of potential threats and will need to react appropriately to minimize risk to our pipelines. Finally, there is a strong indication that DIMP will identify excess flow valves as a potential risk mitigation option that a utility can choose to use. Vectren South already installs these valves on new services, but the Program will expand the use of these to existing customers on the pipelines and services being replaced.

**Q. How do you see DIMP impacting Vectren South?**

A. DIMP will result in additional required O&M activities regardless of the type and condition of utility's assets. However, it is expected that a significant amount of additional requirements will be highly dependent on the types of assets, condition of those assets and the identified threats. Most of the risk mitigation measures are O&M activities, such as additional leak surveys, patrols, job site inspections and others. One potential mitigation measure could well be an accelerated bare

steel and cast iron replacement program. It is likely that because of the age and typical performance of bare steel and cast iron mains in the industry, these facilities will drive more additional O&M activities than will protected steel or plastic mains. As such, a replacement program may be the most appropriate risk mitigation measure. It is fair to assume that some Program expenses will be required under DIMP, and still other DIMP related costs can be avoided if the Program is pursued diligently.

**Q. Do you have any expectation of the costs of DIMP?**

A. This information is too early in the development to understand the financial impact to Vectren South. However, approximately 96% of Vectren South's pipeline mileage will be impacted by DIMP and as such it is highly likely that DIMP will drive significant additional costs. Prudent capital improvements, such as those contemplated in the Program, will not only allow us to adhere to the DIMP requirements, but also minimize future maintenance costs. Therefore, apart from the operating cost savings estimated above, there is an aspect of avoided costs due to DIMP that add to the benefits of the Program.

**Q. Do you have any expectation as to when the DIMP rules will go into effect?**

A. While no formal rulemaking has been initiated, I would anticipate these rules going into effect in 2007. This is based on information obtained via participation in the Distribution Integrity Management Steering Group ("DIMSG") which is coordinated through the AGA.

**Q. How does Vectren South propose to recover the capital investment associated with the Program?**

A. Petitioner's Witness Scott E. Albertson describes the regulatory mechanism (Distribution Replacement Adjustment), under which Vectren South proposes to recover its incremental capital investments under the Program.

## II. Integrity Management Program ("IM Program") Expenses.

**Q. Is Vectren South seeking to include its deferred IM Program expenses in base rates?**

A. Yes. In its Order in Cause No. 42596, the Commission approved a tracking mechanism that allows Vectren South to recover its yearly expenses that are prudently-incurred, incremental, non-capital expenses which are caused by the requirements of the federal Pipeline Safety Improvement Act of 2002 ("Safety Act"). The yearly recovery is subject to certain caps. The first year the tracker mechanism was in place, Vectren South's recovery of these expenses was capped at $750,000. Thereafter, the annual cap on recovery has been $500,000. In that Order, the Commission also authorized Vectren South to defer pipeline safety expenses that exceed the cap each year and recover those expenses in its next base rate case.

**Q., Has Vectren South filed annual applications with the Commission to update the tracker unit rates?**

A. Yes. Those filings will be described in detail by Petitioner's Witness Scott E. Albertson in his testimony.

**Q. Can you briefly describe the Safety Act's assessment requirement?**

A. Yes. The Safety Act requires each operator to complete an assessment of its entire transmission system in high consequence areas ("HCAs") by December 17, 2012. An "assessment" is an inspection that must be performed on the segments of Vectren South's transmission pipeline system in HCAs to evaluate the integrity of each segment. Examples of assessments include internal inspections, pressure testing, direct assessments, or alternative methods that the Secretary of Transportation determines would provide an equal or greater level of safety as appropriate assessment methodologies. Because of the design and operating characteristics of our system, the only option truly available to Vectren South to assess its pipeline is the direct assessment method. For example, because of a lack of redundancy in its system, pressure testing as a means of assessment would hinder Vectren South's ability to provide reliable service to its customers because large segments of its system would have to be shut down to perform the tests. Additionally, in-line inspection methodology is not appropriate

because prior to mid-1994, the Vectren South transmission system was not, nor was it required to be, designed to accommodate the passage of internal inspection devices. As such, significant capital investment would be required to retrofit the pipeline segments. Therefore, direct assessments are required to be performed in order for Vectren South to comply with the Safety Act's assessment requirements.

**Test Year Expenses**

**Q. Please explain the work that Vectren South accomplished between April 1, 2005 and March 31, 2006 relating to its IM Program.**

A. Vectren South completed numerous activities included in its IM Program during the twelve months ending March 31, 2006, and is on schedule to have its baseline integrity assessment of all applicable facilities completed by December 17, 2012 (with the "highest risk" 50 percent of those facilities being assessed by December 17, 2007). During the time period in question, Vectren South was focused on completing the assessments necessary to meet the December 17, 2007 deadline set forth in the Safety Act while minimizing the impacts to its customers. Specifically, direct assessment corrosion surveys were completed on 24 miles of pipeline, and assessments of 36 pipeline casings were completed. Direct examinations were completed as required and remedial repairs were made as needed. In addition to the assessment work described above, Vectren South completed its Public Awareness requirements and provided training to employees who have been assigned responsibility for carrying out the various tasks within the IM Program. Vectren South also continued to pursue the improvement and integration of its data into its Risk Assessment Model. Vectren South updated its Integrity Management Plan to support the continuous improvement expectations of the Safety Act. The annual update of the National Pipeline Mapping System ("NPMS") was completed as required, and post assessment activities from pipelines assessed during 2004 were completed. Field activities included the maintenance of our rights-of way along approximately 24 miles of high consequence area pipeline. As a result of the foregoing actions, Vectren South is achieving the objectives of the Safety Act by discovering and

repairing anomalies on its system, which in turn is creating a safer and more reliable system for its customers and the general public.

**Q. What total incremental IM Program costs were incurred from April 1, 2005 through March 31, 2006?**

A. The total incremental IM Program costs for Vectren South during this period are $1,195,765. The actual costs by month are listed in Petitioner's Exhibit No. JMF-11. Additionally, Petitioner's Exhibit No. JMF-12 compares the costs incurred to the estimate for 2005 as submitted by Mr. Scott E. Albertson in Cause No. 42596. Vectren South's actual costs for this time period were fairly close to the previous estimates for 2005. These costs are deferred for recovery under the Pipeline Safety Adjustment Tracker authorized in Cause No. 42596. See Petitioner's Exhibit MSH-2 Adjustment A27 for the proposed treatment of these deferred costs.

**Q. Can you provide a detailed explanation of these costs?**

A. Yes. Petitioner's Exhibit No. JMF-12 provides the detailed breakdown of the IM Program costs by the primary IM Program requirements. These requirements are identified and grouped into four categories: Assessments, Data, Data Integration and Program Management. As discussed previously, because of the requirement to complete half of the required baseline assessments by December 2007, Vectren South's focus has been on the completion of assessments. Petitioner's Exhibit No. JMF-13 summarizes these costs into the primary work categories. Of the $1,195,765 expended on the Vectren South IM Program, $1,082,676 was directly attributable to the completion of assessments. This work included the research and preparation of the rights-of-way, the direct assessment of the pipelines, the direct examination of the pipelines and the inspection of casings on those pipelines. Data integration accounted for $61,714. This work included improvements in the GIS data, production of maps and documents used in the IM Program as well as resources to manage and store the data received during inspections. The remaining costs were associated with the general IM program requirements and management oversight.

**Q. What is meant by "Data Integration"?**

A. The Safety Act requires operators such as Vectren South to engage in a continuous improvement process by taking system data obtained during the assessment process, as well as during other activities and integrate that data into its existing plans so that they continue to evolve as Vectren South's system evolves. "Data Integration" refers to this process.

**Q. Please describe the Data Integration activities performed by Vectren South during this time period and how they support the requirements of the Safety Act?**

A. During the applicable time period, Vectren South completed an upgrade to its GIS system which moved all GIS databases to a common platform, providing improved data integration capabilities to Integrity Management personnel. From there, Vectren South also began working with its GIS vendor on putting in place various data integration applications. These applications are expected to be completed and in service in August 2006. Once in place, these applications will allow Vectren South to integrate various forms of data into its existing plan and make any modifications thereto that may be necessary as a result of the new data. These continuous improvement initiatives are required by the Safety Act to ensure that high consequence areas are properly identified, as they may change over time, and that our plan is updated periodically to ensure that these areas are captured and evaluated at the appropriate intervals. At the same time, the GIS applications were being developed, Vectren South was receiving new assessment data and other information which needed to be managed in preparation for data integration once the applications are implemented. Efforts to improve data, produce documents to aid in IM Program management and assessment processes, and to manage and store data has been ongoing. The implementation of the GIS application will provide Vectren South with tools to efficiently manage the IM Program. Additionally, these applications will allow Vectren South to complete the data integration requirements of the Safety Act.

**Q. Are all of the costs incurred by Vectren South reasonable and necessary costs?**

A. Yes. As described above, all of the costs incurred by Vectren South were incurred as a direct result of the Safety Act's requirements and were necessary to ensure compliance with the Safety Act.

**Q. How much of the incremental IM Program expenses remain deferred for period from April 1, 2005 through March 31, 2006?**

A. As described above, under the Settlement, Vectren South was allowed to request recovery of up to $500,000 of deferred expenses for the period from April 1, 2005 through March 31, 2006. The remaining amount of $695,765 ($1,196,765 - $500,000) is proposed to be recovered through base rates as detailed in Petitioner's Exhibit MSH-2 Adjustment A27.

**Pro Forma Year Expenses**

**Q. Please explain how Vectren South will recover its IM Program costs for the next twelve month period.**

A. With respect to the next twelve months of the Program (ending March 31, 2007), under the Settlement the authorized deferred expense for which recovery can be requested in accordance with the Commission Order for that period is $500,000. The total deferred expense of $695,765 from the period of April 1, 2005 through March 31, 2006 will yet again not be fully recovered ($195,765 will remain). Additionally, there will be expenses incurred from the IM Program by Vectren South during the period from April 1, 2006 through March 31, 2007. Refer to Petitioner's Exhibit No. MSH-2 Adjustment A27 for further detail on this balance.

**Q. What are the estimated IM Program costs that Vectren South will incur from April 1, 2006 through March 31, 2007?**

A. The estimated costs for the IM Program for Vectren South over this period are $1,399,892. Petitioner's Exhibit No. JMF-14 and Petitioner's Exhibit MSH-2 Adjustment MSH-2 Adjustment A27 provide the details behind this estimate.

**Q. What is the total expense Vectren South will have deferred after the period ending March 31, 2007?**

A. Assuming that actual expenditures equal the current IM Program estimate for the period ending March 31, 2007, Vectren South will have deferred expenses of $2,095,657 ($695,765 + $1,399,892). After requesting recovery of the authorized amount of $500,000 for this period in 2007 via the Rider, there will remain $1,595,657 of expenses yet to be recovered. Petitioner's Witness M. Susan Hardwick discusses Vectren South's proposal to amortize these expenses in Petitioner's Exhibit MSH-2 Adjustment A27.

**IM Program Audit**

**Q. Has Vectren South's Integrity Management Program been audited?**

A. Yes. PHMSA and the IURC Pipeline Safety Division participated in an audit of Vectren South's Integrity Management Program in May 2006.

**Q. Have the results of the audit been finalized?**

A. To date, no final audit report has been issued by PHMSA or the IURC. However, PHMSA circulated a Draft Integrity Management Inspection Summary Report and asked Vectren South to comment on the report.

**Q. Could you briefly describe the findings set forth in the draft report?**

A. In the report, PHMSA correctly noted that Vectren South's focus to date had been on completing assessments, and PHMSA did not take issue with the assessments that have been completed to date. Those assessments, as well as all other work performed to date, have been useful and necessary to implement our Program and are required under the Safety Act.

PHMSA identified several areas where it believed that Vectren South could improve upon its program. First, PHMSA suggested that Vectren South increase the number of personnel devoted exclusively to carrying out the Program. Second, PHMSA suggested that Vectren South include more procedural detail in several areas of Vectren South's Integrity Management Program document. Specifically, the PHMSA team suggested during the audit that the procedures should be detailed enough to remove any question as to how the procedures

should be executed. Third, PHMSA suggested that Vectren South place a greater emphasis on documenting its basis for decision making so that if assumptions were being made, these would be noted so that in the future, these assumptions could be recalled, if necessary. Fourth, PHMSA suggested that Vectren South collect more data in certain areas and that the data collected be incorporated into the risk model. Fifth, PHMSA suggested that Vectren South develop detailed procedures to gather and integrate non-assessment data into its existing model. Sixth, PHMSA stressed the importance of completing the Baseline Assessment Plans for 2004 and 2005 and suggested that Vectren South develop procedures to complete the required assessment work.

**Q. What is Vectren South doing to address the issues raised by PHMSA in the draft report?**

A. Although the report is not final at this point, Vectren South is committed to addressing the suggested improvement areas raised by PHMSA while continuing to prudently manage costs. To this end, Vectren South has undertaken certain organizational changes to address PHMSA's concerns. Vectren South is adding eight additional FTE's to the Program, including five engineers, one field supervisor, and two inspectors and expects to have these positions filled by the end of October. A Project Manager has also been hired to manage the IM Program and facilitate the implementation of the measures suggested by PHMSA. Vectren South is also hiring additional contract engineering staff with Integrity Management experience to assist with the IM program as well as engaging additional internal resources to assist with the IM program, including corrosion personnel, engineering support, administrative support, and field operations personnel. These additional resources will review and modify all Vectren South Integrity Management procedures in response to PHMSA's recommendations, will develop detailed procedures and documentation requirements as may be necessary, and will assist in further efforts to collect additional data to incorporate into the risk model. Finally, Vectren South will complete the implementation of a database and application to facilitate an efficient data integration process.

**Q. Does the estimate set forth above for IM program expenses from April 1, 2006 through March 31, 2007 include costs of addressing the concerns raised by the audit team?**

A. Yes, the $1,399,892 in estimated costs mentioned above includes the additional resource requirement raised by the audit team. To date, Vectren has endeavored to prudently manage expenses under the IM program, and it will continue to do so in the future.

**Q. Are these costs reasonable and necessary in order to ensure compliance with the Safety Act?**

A. Yes. A guiding principle of the Safety Act is that continuous improvement of the IM Program is required. Section §192.907 of the DOT Rule states "The initial integrity management program must consist, at a minimum, of a framework that describes the process for implementing each program element, how relevant decisions will be made and by whom, a timeline for completing the work to implement the program element, and how information gained from experience will be continuously incorporated into the program. ***The framework will evolve into a more detailed and comprehensive program. An operator must make continual improvements to the program.***" All of the costs incurred to date have been spent as Vectren South ramped up its IM Program and performed assessments to meet the Safety Act deadlines. We will continue to improve the Program and will continue to meet regulatory requirements for completing assessments.

**Q. Does this conclude your testimony?**

A. Yes.

**VECTREN SOUTH**
**Distribution Pipeline Mileage**
**by Material Type**

| Year | Bare Steel | Cast Iron | Protected Steel | Plastic | Total |
|---|---|---|---|---|---|
| 2000 | 133 | 180 | 1043 | 1468 | 2824 |
| 2001 | 131 | 172 | 1043 | 1515 | 2861 |
| 2002 | 128 | 168 | 1042 | 1553 | 2891 |
| 2003 | 124 | 166 | 1041 | 1591 | 2922 |
| 2004 | 123 | 164 | 1042 | 1616 | 2945 |
| 2005 | 119 | 160 | 1043 | 1710 | 3032 |

* Source Data: Annual DOT Report Form PHMSA 7100-1.1

## DOT ANNUAL REPORT
## DISTRIBUTION MAIN MILEAGE SUMMARY

### Industry Averages

| DOT INDUSTRY DATA | 2002 | 2003 | 2004 | 2005 |
|---|---|---|---|---|
| Total Bare Steel | 61664 | 56315 | 57336 | 51783 |
| Total Cast Iron | 42025 | 41091 | 40600 | 37319 |
| Total Main Mileage | 1136732 | 1107363 | 1154763 | 1092788 |

| Replacement Rates | 2002 | 2003 | 2004 | 2005 | Average |
|---|---|---|---|---|---|
| Total Bare Steel | | 8.7% | -1.8% | 9.7% | **5.5%** |
| Total Cast Iron | | 2.2% | 1.2% | 8.1% | **3.8%** |
| Total Bare Steel & Cast Iron | | 6.1% | -0.5% | 9.0% | **4.8%** |

| Percentage of System | 2002 | 2003 | 2004 | 2005 |
|---|---|---|---|---|
| Total Bare Steel | 5.4% | 5.1% | 5.0% | 4.7% |
| Total Cast Iron | 3.7% | 3.7% | 3.5% | 3.4% |

### VECTREN SOUTH Averages

| DOT INDUSTRY DATA | 2002 | 2003 | 2004 | 2005 |
|---|---|---|---|---|
| Total Bare Steel | 128 | 124 | 123 | 119 |
| Total Cast Iron | 168 | 166 | 164 | 160 |
| Total Main Mileage | 2891 | 2922 | 2945 | 3032 |

| Replacement Rates | 2002 | 2003 | 2004 | 2005 | Average |
|---|---|---|---|---|---|
| Total Bare Steel | | 3.1% | 0.8% | 3.3% | **2.4%** |
| Total Cast Iron | | 1.2% | 1.2% | 2.4% | **1.6%** |
| Total Bare Steel & Cast Iron | | 2.0% | 1.0% | 2.8% | **1.9%** |

| Percentage of System | 2002 | 2003 | 2004 | 2005 |
|---|---|---|---|---|
| Total Bare Steel | 4.4% | 4.2% | 4.2% | 3.9% |
| Total Cast Iron | 5.8% | 5.7% | 5.6% | 5.3% |

Petitioner's Exhibit No. JMF-3
Vectren South
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# Main Leakage Rates
# Main Leaks Caused by
# Corrosion, Material & Welds, Natural Forces & Other

| Main Leaks Repaired | 2003 | 2004 | 2005 |
|---|---|---|---|
| Bare Steel | 49 | 149 | 172 |
| Cast Iron | 9 | 44 | 55 |
| Coated Steel | 27 | 105 | 126 |
| Plastic | 12 | 31 | 38 |

| Miles of Main | 2003 | 2004 | 2005 |
|---|---|---|---|
| Bare Steel | 124 | 123 | 119 |
| Cast Iron | 166 | 164 | 160 |
| Coated Steel | 1041 | 1042 | 1043 |
| Plastic | 1591 | 1616 | 1710 |

| Leak Rate | 2003 | 2004 | 2005 |
|---|---|---|---|
| Bare Steel | 0.40 | 1.21 | 1.45 |
| Cast Iron | 0.05 | 0.27 | 0.34 |
| Coated Steel | 0.03 | 0.10 | 0.12 |
| Plastic | 0.01 | 0.02 | 0.02 |

* 2003 data represents a partial data set because of a system change but illustrates similar results as 2004 and 2005

## Leakage Rate Comparisons

### Industry Averages

| | 2003 | 2004 | 2005 |
|---|---|---|---|
| Corrosion Leaks/Mile BS | 2.47 | 2.62 | 2.55 |
| (Corr+Matl+NatForce+Other)/Mile BS & CI | 3.12 | 3.36 | 3.34 |
| Total Leaks/Total Mileage | 0.67 | 0.46 | 0.45 |

### VECTREN SOUTH Averages

| | 2003 | 2004 | 2005 |
|---|---|---|---|
| Corrosion Leaks/Mile BS | 1.92 | 1.89 | 2.31 |
| (Corr+Matl+NatForce+Other)/Mile BS & CI | 2.88 | 5.57 | 5.46 |
| Total Leaks/Total Mileage | 0.51 | 0.69 | 0.64 |

* Source data from Annual DOT Report forms PHMSA 7100.1.1

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## Bare Steel & Cast Iron Leak Repairs
## by Leak Hazard

| As Found Hazard | 2003 | 2004 | 2005 | Total | % of Total |
|---|---|---|---|---|---|
| CONFINED SPACE (VAULT, PIT) | 2 | 0 | 1 | 3 | 1% |
| INSIDE BUILDING | 1 | 1 | 0 | 2 | 0% |
| MANHOLE, CATCH BASIN, SEWER, ETC. | 1 | 12 | 10 | 23 | 4% |
| NEAR BUILDING WALL | 9 | 27 | 38 | 74 | 13% |
| PAVING TO BUILDING WALL | 1 | 13 | 3 | 17 | 3% |
| Minimal to No Hazard | 75 | 196 | 188 | 459 | 79% |
| Total BS&CI Leaks Repaired | 89 | 249 | 240 | 578 | 100% |

# of Hazardous Leaks represents 21% of BS & CI Leaks Repaired from 2003 through 2005

## Bare Steel & Cast Iron Leak Repairs
## by Leak Class

| As Found Hazard | 2003 | 2004 | 2005 | Total | % of Total |
|---|---|---|---|---|---|
| Class 1 | 14 | 40 | 30 | 84 | 15% |
| Class 2 | 29 | 96 | 95 | 220 | 38% |
| Class 3 | 46 | 113 | 115 | 274 | 47% |
| Total BS&CI Leaks Repaired | 89 | 249 | 240 | 578 | |

**Utilities with Similar Replacement Programs**

| |
|---|
| Centerpoint Energy |
| Atlanta Gas Light |
| Duke Energy (Cinergy) |
| Northern Utilities (Maine) |
| Missouri Gas Energy |
| Northern Utilities (New Hampshire) |
| Northwest Natural |
| Nashville Gas |
| Roanoke Gas |
| SEMCO |
| Chattanooga Gas |
| Elizabethtown Gas |
| Laclede Gas |
| Duke Energy (Kentucky) |

# Vectren South Estimated Capital Requirements

| | | | Replacement Cost | Capital Requirements |
|---|---|---|---|---|
| **MILES OF DISTRIBUTION MAIN** | **Mileage** | **Footage** | **$45/foot** | **20 Year** |
| Unprotected Bare Steel | 119 | 628320 | $ 28,274,400 | $ 1,413,720 |
| Cast Iron | 160 | 844800 | $ 38,016,000 | $ 1,900,800 |
| **TOTAL DISTRIBUTION MAIN** | **279** | **1473120** | **$ 66,290,400** | **$ 3,314,520** |
| | | | | |
| | | | **Replacement Cost** | **Capital Requirements** |
| **NUMBER OF SERVICES** | **Count** | | **$2400/Service** | **20 Year** |
| Unprotected Bare Steel | 491 | | $ 1,178,400 | $ 58,920 |
| Unprotected Coated Steel | 2643 | | $ 6,343,200 | $ 317,160 |
| Protected Bare Steel | 2343 | | $ 5,623,200 | $ 281,160 |
| Service Tie-Overs ($600 EA) | 16384 | | $ 9,830,400 | $ 491,520 |
| **TOTAL SERVICES** | **21861** | | **$ 22,975,200** | **$ 1,148,760** |
| | | | | |
| **Total Replacement Cost** | | | **$ 89,265,600** | **$ 4,463,280** |

* Replacement Costs assumed to be in 2006 Dollars
* Cost Averages arrived at from historical averages

# Independent Review of Cast Iron and Bare Steel Pipe Replacement Program

*Submitted to*

VECTREN

**Vectren Energy Delivery**

*August 24, 2006*

Shaw® Stone & Webster Management Consultants, Inc.

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# 1 Executive Summary

## 1.1 Introduction

Stone & Webster Management Consultants, Inc. ("Stone & Webster Consultants") was selected by the Vectren Energy Delivery ("Vectren") to provide our engineering consultant expertise and services in analysis of an accelerated main replacement program. Vectren is an energy holding company headquartered in Evansville, Indiana. Through its wholly owned subsidiary, Vectren Utility Holdings, Inc. it holds three operating utilities, Vectren Energy Delivery of Indiana - North ("VEDI-N") (formerly Indiana Gas), Vectren Energy Delivery of Indiana - South ("Vectren South" or "VEDI-S") (includes the customers of former Hoosier Gas Corp and Southern Indiana Gas and Electric Company ("SIGECO")), and Vectren Energy Delivery of Ohio ("VEDO") (the former natural gas assets of Dayton Power and Light Company). The focus of this report is on Vectren's wholly owned subsidiary, VEDI-S.

VEDI-S provides energy delivery services to approximately 112,000 gas customers located in and around Evansville in southwestern Indiana. As part of its distribution system, VEDI-S has continued to rely upon some 279 miles of gas mains, which are comprised of bare steel ("BS") and cast iron ("CI") material dating back to years 1926 and 1899, respectively. The aged BS and CI mains continue to be the predominant source of gas leaks on the distribution system. Either corrosion of the pipe or failing couplings are the main problems found to result in leaks. As practiced by most natural gas distribution companies, efforts have been undertaken to replace these problem causing and potentially dangerous system components with updated piping material. The replacement program currently in-place by VEDI-S is an informal program that is more opportunistic than proactive, resulting in investments of about $1.5 million per year. Using this approach, VEDI-S will only very gradually replace the old piping over time.

To mitigate the risks for future leak events and to approach the replacement program in a more deliberate, economic and accelerated manner, Vectren engaged Stone & Webster Consultants to review its asset information, leak and system performance history in order to provide an independent assessment on the need for the proposed BS and CI replacement program and establish a ranking for leak vulnerability in its BS and CI mains segments. This report documents the results of our review and analysis.

## 1.2 Analysis

The purpose of our analysis, was to confirm the need for the expedient replacement of the degrading BS and CI mains, identify the mains most highly at risk, and therewith provide guidance on where the priorities should be established in implementing a more formal and timely BS/CI main replacement program. To accomplish this we utilized a multivariate linear regression technique, to identify from the historical leak records, the variables that statistically have the most influence on a BS/CI main leak. Formulated into an equation and applied to the company records on the BS/CI segments on the system, we were able to rank those segments in order of leak risk.

The data required for the study of the BS and CI mains was provided by VEDI-S from two primary stores of data, the Gas Compliance System ("GCS"), and the G.E. Smallworld Geographical Information System ("GIS"). The GCS provided the leak records that were used to analyze the system as a whole as well as provide data necessary to perform our regression analysis. The GIS provided the VEDI-S records of

installed CI and BS main segments dating to 1899 and 1926, respectively. These segments were ranked by risk based on the results of our analysis of the leak data.

## 1.3 Findings and Considerations

Considering that the linear footage of BS and CI mains represents only 4% and 5%, respectively, of the VEDI-S system mains, and that these mains contributed to 61% of the system repaired leaks from 1994 to 2005, it is obvious that attention must be given to this portion of the system in order to improve upon the safe and efficient operation. When comparing BS and CI to other system mains comprised of coated steel and plastic, the leak numbers dramatically show how problematic the older piping material is. For the period from 1994 to 2005, for every 100 miles of BS and CI mains there were nearly 50 times as many leaks than found on every 100 miles of coated steel and plastic mains. The numbers indicate that the replacement of a relatively small percentage of the system can have an inordinately large impact on the number of system leaks and thus the overall system safety and the resources consumed by the leaks. While it is important to immediately focus on the most problematic BS and CI mains, a plan should be progressed that addresses all BS and CI, as the aging mains continue to degrade, presenting an ongoing burden to the system. This is evidenced by the increasing leaks repaired over the last five years. VEDI-S has recognized the urgent need to replace the remaining BS and CI components of its distribution system. By planning to implement an expedited replacement program, similar to other utilities, VEDI-S is operating proactively in the elimination of problematic system components.

*Based on our experience with other utilities experiencing like problems with BS and CI, Stone & Webster Consultants recommends the implementation of an expedited BS and CI main replacement program.*

Confirming the need and urgency to replace the BS and CI mains, Stone & Webster Consultants provided our experience to assist VEDI-S in the prioritization of mains for replacement. Through statistical analysis we attempted to identify the best mathematical relationship of the pipe and environment variables influencing the probability of a leak. Our Reference Case is based on our knowledge of distribution system components and represents our best estimate of the ranking of mains at risk. Our most meaningful regression analysis results were obtained when utilizing the following independent variables relating cause to a leak event:

1) Pipe material type
2) Gas pressure
3) Depth of pipe burial
4) Year of installation

The final ranking, by risk associated with the independent variables above, are tabulated for each CI and BS segment of the VEDI-S distribution system for the Reference Case. It can be shown that, as part of a complete BS and CI replacement program, with the initial replacement of only a modest cumulative length of main segments, the overall system risk to leaks can be significantly reduced in the short term when prioritizing for replacement the mains at greatest risk. We recommend the use of the Reference Case risk ranking by VEDI-S to establish a logical and economic grouping of segments for replacement in conjunction with a replacement strategy that recognizes and incorporates the following:

- Specifically dated and high pressure pipe
- Pipe in close proximity to high occupancy buildings

- The continuation of the building of a comprehensive and consistent leak data base with identified attributes

Stone & Webster Consultants also reviewed leak data for VEDI-S from the DOT Office of Pipeline Safety ("OPS"). Based on our findings we conclude that the current opportunistic replacement program at VED-S has not significantly improved the situation of BS and CI mains remaining in service, as the leaks, and thus the leak repairs, have been increasing. Our findings confirm the need and urgency for the replacement of BS and CI mains on the VEDI-S system and our recommendations regarding the manner in which the replacement is prioritized in an overall program is provided in this report.

# 2 Introduction

To deliver natural gas to its customers VEDI-S has remaining in its distribution system some 279 miles of gas mains which are comprised of BS and CI material dating back to years 1926 and 1899, respectively. VEDI-S used CI for its mains during its early development in and around Evansville. The other VEDI-S areas north of Evansville primarily used BS for its early vintage mains. The installation of these unprotected pipe systems was practiced until 1962 when coated steel pipe was introduced into the system and to the industry. Current replacement practices for old metallic distribution mains use plastic pipe exhibiting no corrosion properties and limited opportunity to age degradation.

BS mains on the system range in size from 1.25 inch to 6 inch, while CI mains are in the 3 inch to 24 inch diameter range. Gas pressure on some points of the distribution system is as high as 60 psig. The aged CI mains with their bell and spigot coupling, and the BS mains, mechanically coupled or with threaded/welded joints, have been the predominant source of gas leaks on the distribution system. The corrosion of the pipe or failing couplings are the main problems that have resulted in leaks. Many utilities have implemented accelerated mains replacement programs to eliminate these factors, thus minimizing their exposure to risk and degrading system integrity.

Natural gas leaks are treated as serious events with potential elevated severity as these older metallic mains continue to degrade. Depending on the gas escape rate, a leak may often require reporting to the Department of Transportation ("DOT"). The decision to repair or replace a leaking main involves the consideration of many variables. Vectren uses their Optimain program to assist the engineering personnel in making the determination of whether to repair or replace a segment of main piping.

Recognizing the potential for continuing deterioration of the BS and CI components of the system, VEDI-S embarked on an informal replacement plan in 1990. A formal program was not devised to identify and/or remove the most leak-vulnerable pipe. Replacement generally proceeded under the following guidelines:

- general convenience and opportunity to extend upgrading for high pressure distribution on areas with low pressure feeds
- improvements required in areas in need of higher capacity/pressure
- replacement in areas where high water tables were causing problems
- capturing economies of scale where the municipalities were unearthing for infrastructure work

Generally, from about year 2000, the annual cost related to BS and CI main replacement program ranged from $250,000 to $1,500,000, with additional dollars spent on service replacement. To mitigate the risks for future leak events and to approach the replacement program in a more scientific and economic manner, VEDI-S engaged Stone & Webster Consultants to review its leak history and establish a ranking for leak vulnerability in its BS and CI mains segments.

# 3 VEDI-S Data

The data required for the study on the accelerated main replacement program was provided by Vectren from two primary stores of data. The first is the GCS, which houses the data recorded from Leak Case Reports (required for each new leak) used by field personnel in the investigation of leaks encountered on the system. The GCS system contains compliance rules for each of the leak classifications. It schedules inspections and repairs based on these rules. The data used in this study for the leak analysis was extracted from the GCS system.

The geographical location of the mains, or pipeline segments, in the system is kept in Vectren's G.E. Smallworld GIS, the second primary store of data. The two data bases, GIS and GCS, house somewhat different pipe data in each. While the data in GIS is more of an as-built record, the GCS captures information on the pipe related to the encountered leak. To effectuate the analysis of leak causes and to identify the mains at-risk, it was necessary to cross populate some of the main data from/into the two primary data bases.

As a result of company aggregation history, different recording practices were used over the years for the leak records. Many of the leak records did not specify the type of pipe material. In 2002, the leak data from Posey, Vanderburgh, Warrick, Gibson and Spencer counties was imported from a Paradox based leak tracking system to the GCS. Since a portion of the territory (Pike, Knox and Daviess counties) was not using Paradox to track leaks, data was manually entered on open and closed leaks from hardcopy leak reports into GCS for the time range 1994 - 2002.

The pipeline segment data used for the analysis was extracted from the GIS. The natural gas distribution network is comprised of 3032 miles of mains that includes 119 miles of BS mains and 160 miles of CI mains. Since the leaks and segments were not linked, a manual effort was required to associate the leaks to the pipelines. Predecessor manual mapping systems were used and old work-orders were examined to validate the "Installation Date" data within the GIS. Vectren had records of installed CI and BS mains dating to 1899 and 1926, respectively. The transition to wrapped steel mains was made in 1962 in the Washington and Vincennes area and 1965 in the Evansville area.

The leak data used in our analysis is listed below.

- Pipe Segment Length – the length of pipe segment, which can be an arbitrary assignment made up of multiple pipe joints or simply a valve, regulator or replaced pipe section. Segments lengths vary from one foot to thousands of feet. This data is not a factor causative of leaks, and is used only in the segment data base.
- Pipe Material Type – either BS or CI, for this study
- Pipe Burial Depth – the measure of feet below the surface at which the pipe is buried
- Coverage Type – the type of coverage at the surface over the pipe, including grass, gravel, asphalt or concrete.
- Pressure – the maximum pressure at which the pipe is operated
- Risk Class – the classification related to the population density housed within the structures up to 100 feet from the distribution line. This parameter is used in consideration outside of the regression analysis.

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- Pipe Diameter – the nominal diameter of the pipe in inches.
- Joint Type – the mechanism by which piping is joined. Joints include bell and spigot, mechanical, threaded or welded.
- Leak Cause –only leaks that are caused by corrosion or joint failure were considered which resulted in 1081 leaks being used in the analysis. Vectren has sorted the leaks to include only the appropriate ones for this study.
- Year of Installation – the year in which the pipe was installed.

# 4 Approach to BS and CI Replacement Prioritization

Our approach to identifying the prioritization of BS and CI mains replacement is to provide a tool to address the well recognized need for a replacement program. Through analyzing the data provided by VEDI-S, and by comparison to ongoing industry practice to prevent and mitigate the risks associated with BS and CI mains, the replacement of such should be a top priority for VEDI-S. The following attempts to offer a means by which the program should prioritize the replacement of BS/CI segments.

Stone & Webster Consultants assessed the characteristics of the BS and CI segments of the system to identify the risk or likelihood of a natural gas leak. Stone & Webster recommends that the results of this assessment be utilized by VEDI-S in their BS/CI Main Replacement Program. Directly inspecting the condition of distribution piping in-situ cannot be carried out in the great majority of cases, so most information about the condition of mains and services is derived from data collected when repairing, replacing or surveying pipe segments. Evaluating the condition, remaining life and the serviceability of underground utility assets is a challenging and a difficult task. Unlike aboveground assets that are available for direct inspection, underground assets remain hidden from view. There are only bits of information that are available for the evaluator to glean and peer into the asset conditions. Therefore, Stone & Webster Consultants based their assessment on experience with other utilities, and our knowledge on causative leak conditions, in addition to the results of a regression study.

For our analysis, to identify the mains most highly at risk, and therewith provide guidance on where the priorities should be established in implementing an expedited BS/CI main replacement program, we applied mathematical statistics to the data on-hand at VEDI-S. Our approach centers on identifying the factors that are causative in producing a leak. Conceptually, if the leaks recorded show repeating similarities in pipe and environmental properties, then statistically these repeating similarities can be identified, given weight of importance and mathematically manipulated to structure a predictive model that ranks the leak vulnerability, or risk, of a segment of pipe on the system. To accomplish this we utilized a multivariate linear regression technique, to identify from the historical leak records, the variables that statistically have the most influence on a BS/CI main leak. Formulated into an equation and applied to the company records on the BS/CI segments on the system, we were able to rank those segments in order of leak risk.

Data available on gas distribution systems can vary significantly both in quality and quantity depending on the utility. The data must be carefully evaluated and assessed before using it in analyses. Often assumptions are necessary to fill in the missing pieces of data. As in any analytical exercise, the assessment/evaluation of the distribution system remains based on the quantity and quality of data. This data is subjected to statistical analysis techniques in order to make inferences on the whole of the system.

# 5 Findings and Considerations

## 5.1 Need for BS and CI Mains Replacement

Many utilities nationwide and internationally are recognizing the need for the replacement of ageing unprotected metallic system mains. As found on other systems, VEDI-S is experiencing an unusually high percentage of leaks from its BS and CI mains as they continue to fail, predominantly due to corrosion. From 1994 to 2005 fully 61% of the leaks repaired on VEDI-S's system were on BS and CI mains, which represent only 4% and 5%, respectively, of mains in place. Additionally, as these mains age, they continue to corrode and degrade and represent an ever increasing risk to the system. It has been shown (illustrated in Figure 2 of the Appendix), that leaks from BS and CI over the last five years have been increasing steadily on VEDI-S's system.

The contribution to leaks by BS and CI on the VEDI-S distribution system becomes more apparent when compared to coated steel and plastic mains on the system. From 1994 to 2005, BS has contributed 387 leaks per 100 miles of BS mains, while CI has burdened the system with 146 leaks per 100 miles of CI mains. In comparison, coated steel and plastic pipe have contributed to only seven and four leaks per 100 miles of coated steel and plastic mains, respectively. Given the significant differences in operational performance history, the expeditious replacement of the remaining BS and CI mains would substantially improve the safety and integrity of the VEDI-S system.

A recent study prepared for the American Gas Foundation titled "Safety Performance and Integrity of the Natural Gas Distribution Infrastructure" found that of the distribution companies surveyed, 65% have a planned replacement program for their CI mains and 74% have a planned replacement program for their BS mains system. The operators of these companies have identified higher risk segments of their distribution infrastructure in their BS and CI mains and are taking prevention and mitigation measures to insure the safety and integrity of their systems. In our telephone survey of distribution companies implementing BS and CI replacement programs, we have found those engaged in such to include Missouri Gas Energy, CenterPoint Energy Arkla, Northern Utilities, Inc., New York State Electric and Gas Corp., Rochester Gas and Electric Corp., Elizabethtown Gas, and Atlanta Gas Light Company, to name a few.

Our experience with other utilities in the area of BS and CI replacement programs has provided much insight into the importance other utilities and regulatory agencies place on the need to upgrade distribution systems. BS and CI replacement programs have resulted in significant reduction of corrosion related leaks. Over the four years since Stone & Webster Consultants completed the recommended replacement program for Duke Energy Ohio (formerly CINERGY), their leak rate due to corrosion has declined by 44 percent (as per DOT OPS information). In the case of VEDI-S, it is plain to see, that the replacement of just 9% of the system mains can result in the elimination of 61% of the system leaks. The elimination of 61% of the system leaks has a tremendous impact on the improvement in safety, system integrity and operating economics. Stone & Webster Consultants recommends the implementation of an accelerated BS and CI mains replacement program.

## 5.2 BS and CI Replacement Prioritization

The detail on the multivariate regression analysis and results of this study for the mains replacement prioritization can be found in the appendices to this report. The Appendix contains the following sections:

I. Introduction to Regression Theory
II. Application of Multivariate Regression Analysis to the VEDI-S Distribution System
III. Reference Case Results of Multivariate Regression Analysis to the VEDI-S Distribution System
IV. Supplemental Review

The findings from our regression analysis highlight the requirement for sufficient data of consistent quality to establish a prioritization of assets to be replaced. VEDI-S has significant data on its leak cases and mains segments identification. This information originates from former VEDI-S companies, and therefore was compiled under different data base platforms and houses data containing differing attributes, in some cases. For our mains at risk prioritization study needs, we require consistent data attributes across the entire data set. As a result of the data inconsistencies, our regression outcome did not yield the type of statistical measures that were adequately robust to make definitive recommendations for the prioritization of the BS and CI mains.

In lieu of recommending a prioritization plan based entirely on statistical results that are not conclusively supported, we are proposing a mains replacement strategy based on experience with other utilities, and our knowledge on causative leak conditions, in addition to the results of our regression study. This interim plan should provide continuing system upgrade and information building. The following should be considered in regard to the BS and CI mains replacement program:

1) The currently exercised program should be continued with emphasis on replacing the oldest CI and BS, particularly where the CI pipe is known to be undergoing graphitization and/or subject to high pressure. Special emphasis should be placed on CI pipe installed after 1947 as it is known that this pipe is of longer joint length (18 feet), has thinner pipe wall, and uses mechanical joints. These attributes have been shown to contribute to more significant leak events.

   Additionally, priority should be given to old mains within close proximity to buildings of high residency to reduce the potential for collateral damage.

   Finally, our regression run results from our Reference Case should be incorporated into any BS and CI replacement program to identify mains most highly at risk based on the leak causing attributes of:

   a. Pipe material type
   b. Gas pressure
   c. Depth of burial
   d. Year of installment

   It can be seen from Figure 3, below, that choosing the mains most highly at risk for priority replacement will greatly reduce the overall system risk with only modest miles of initial mains replacement. Figure 3 shows that selecting for replacement the mains with the greatest risk ranking per mile from our Reference Case regression analysis will eliminate the most problematic mains after

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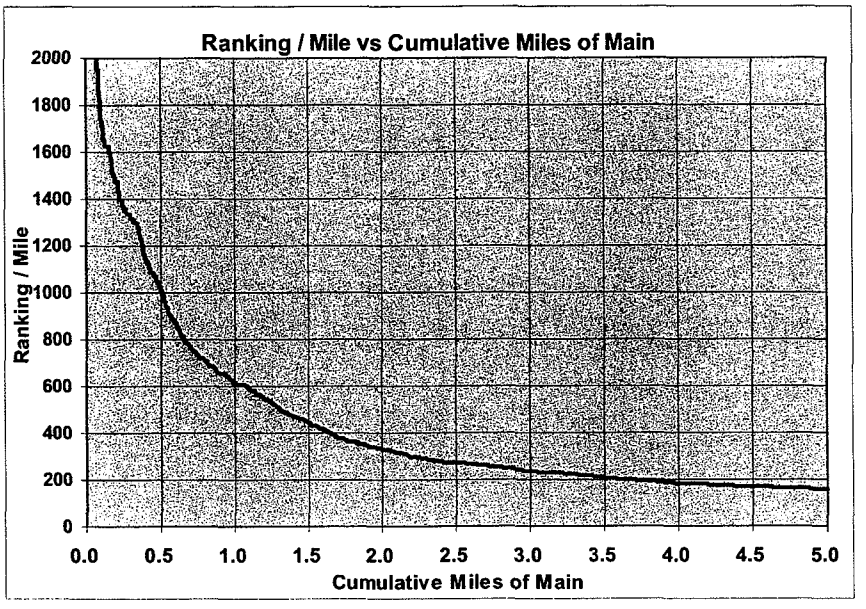
only four miles of mains replacement. While replacement of the mains most highly at risk should be the top priority for any replacement program, it must be part of an overall plan to systematically remove all of the BS and CI mains, as this material continues to degrade and represents a growing burden on the system.

Figure 3




When developing replacement projects other risk factors should be considered such as, but not limited to, the following:

- Gas in building data
- Fracture and corrosion data/zones
- General leakage levels
- General condition of the distribution system or groups of pipes
- Service pipe failure rates in a particular locality as these can provide an indication of potential future deterioration of mains.
- Other mains in the vicinity that are being considered for replacement for other reasons
- Evidence of subsidence or other potentially damaging ground conditions

In planning the replacement programs it is important to remember that the risk ranking from our Reference Case is a tool to support decisions, not make decisions. In the final analysis the selection of individual mains to be replaced should be made on the basis of engineering/economic judgment.

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2) Throughout the course of the replacement program, data pertaining to leak events should be comprehensively recorded and carefully evaluated to build the leak data base in as consistent and complete manner as possible. This data base will augment the mains replacement prioritization program by lending towards evaluation and adjustment, if necessary. We suggest that the following data be recorded, at a minimum, in the system leak data base for each discovered leak event:

   a. Pipe material type
   b. Gas Pressure
   c. Pipe year of installment
   d. Depth of burial
   e. Coverage type (pavement, gravel, grass)
   f. Pipe diameter
   g. Joint type
   h. Cause of leak

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# APPENDIX

## I. INTRODUCTION TO REGRESSION THEORY

Stone & Webster Consultants used a multivariate regression analysis to identify the ranking of CI and BS mains at risk. Regression analysis is a statistical technique that attempts to explain the movements in one variable, the dependent variable, as a function of movements in a set of other variables, known as independent variables. Regression analyses can test whether a significant quantitative relationship exists among the variables.

Single-equation linear regression models examine a dependent variable against a single independent variable, while a multivariate linear regression model, as used in this study, considers more than one independent variable. Both models are used to estimate values for a dependent variable. Specifically, the change in the dependent variable is defined for a movement in one independent variable while holding constant the other independent variables in the equation. In general, multivariate regression allows for the determination of the best estimators for a dependent variable.

The technique used for the regression analysis was the utilization of the "least squares" method as incorporated in the statistical function suite of Microsoft Excel. The least squared method is the most simple and widely used estimation technique. In essence, this technique calculates the coefficients for the regression equation to minimize the squared difference between the actual dependent variable and the dependent variable calculated with the regression equation. The differences are known as residuals. The output results reflect an array of data that describes a straight line that best fits the input data set. The linear equation where the dependent y-value is a function of the independent x-values takes the following form:

$$y = m1x1 + m2x2 + \ldots\ldots + b \text{ (where there are multiple ranges of x-values)}$$

The m-values are coefficients corresponding to each x-value (the independent variable) and b is a constant value. The quality of the estimate is a function of the theory supporting the equation, the applicability to the data set, the suitability of the estimated coefficients relative to the knowledgeable expectations and inclusion of all major variables. The simplest assessment of the fit of the resultant equation is the coefficient of determination, known as $R^2$, which compares estimated and actual y-values, and ranges in value from 0 (zero) to 1.0. For instance, an $R^2$ of 0.5 indicates 50 percent of the original variability of the dependent variable has been explained by the equation while 50 percent remains as unexplained variability. An $R^2$ value of 1.0 implies a perfect fit while declining numbers suggest an increasingly poor fit indicating the regression is not useful in describing the relationship among the variables. The actual quality of the fit is relative to the topic being studied. While a good fit for a time series may require an $R^2$ of 0.95, a sample consisting of different observations might be considered to have a good fit with an $R^2$ of 0.50.

Total leaks were summed for all pipe segments having similar conditions to ensure that the full range and intensity of a cause-and-effect relationship were quantified to the extent possible. Observation having the same installation date, diameter, depth, pavement type, pressure, risk classification, and material were grouped together. As part of the regression analysis, regression statistics (including $R^2$ previously

mentioned) are generated that characterize the relevance of the inputs and the usefulness of the output. Of particular importance is the "t-test" which is used to test hypotheses regarding the relevance of independent variables. In the regression analysis, t-test statistics are calculated for each of the estimated coefficients in the regression equation in order to determine the statistical significance of a particular coefficient. The larger in absolute value of the t-value, the greater the probably the estimated coefficient is greater than zero and the greater the probability that the variability is statistically significant. For purposes of this analysis and given the importance of these variables in empirical observation, Stone & Webster Consultants adopted the default value which sets a 95 percent confidence level that a given variable is statistically significant.

## II. APPLICATION OF MULTIVARIATE REGRESSION ANALYSIS TO THE VEDI-S DISTRIBUTION SYSTEM

The VEDI-S GCS leak records contain considerable information pertaining to repaired leaks including segment identification, town, street, pipe material, pressure, diameter, soil condition, pipe coatings, pipe length, age, traffic load, number of leaks, and open and closed dates among others (See Section 5 on Vectren Data for more details). This data was the basis of Stone & Webster Consultants' selection of a dependent variable and independent variables. Further, Stone & Webster Consultants limited the regression analysis to the leak record information provided by Vectren reflecting the correlation of their GCS and GIS databases that presented consistent data across all the independent variables identified for evaluation, thus allowing for the prediction of leaks for specific pipe segments given a regression model and the available data. Accordingly, to develop the regression model, total leaks, considered to be indicative of conditions resulting in a high propensity for breaks and corrosion, was selected as the dependent variable. The independent variables initially considered include segment length, year installed, diameter, depth, pavement type, pressure, risk classification, and material.

Of the 1081 total leak observations provided to Stone & Webster Consultants, 140 of the data sets included a complete set of the initially considered independent variable data requested. The remaining leak records contained irregular amounts of data for use as independent variables. Given this constraint, Stone & Webster Consultants performed several linear regressions with the known data reflecting the number of leaks by each individual independent variable to test the relative validity in a multivariate approach. In addition, several of the independent variables were also tested, such as material, depth and segment length, in various combinations to evaluate the coefficient of determination (i.e. $R^2$).

As a result of this review of the data, three multivariate linear regressions were performed reflecting both the scope and quality of the data in addition to our experience with similar gas industry studies. We performed Trial Regression I, with 140 leak records; Trial Regression II, also with 140 leak records; and Reference Case regression, with additionally available leak records amounting to 159 leak records. These regressions are discussed briefly below.

The first regression included the previously noted 140 leak records with the most complete set of variables. The independent variables considered were segment length, year installed, diameter, depth, pavement type, pressure, and material. Risk classification was excluded as it is not a relevant factor to leak cause. The results of this regression yielded an $R^2 = 0.1228$.

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The second regression included the same 140 leak records and independent variables used in Trial Regression I except for the segment length variable. The segment length was excluded because when considered individually it was found to have a near zero correlation to the dependent variable. The results of Trial Regression II yielded an $R^2 = 0.0901$.

The final regression was then performed which considered the following variables: year installed, depth, pressure, and material. Pavement type and diameter were excluded as providing no additional precision to the analysis. Based on the physical attributes of the VEDI-S gas distribution system, the significant factors contributing to leak occurrences, and the scope and quality of the data set available, Stone & Webster Consultants believes the independent variables selected for the Reference Case are appropriate for purposes of this analysis at the present time. This regression included 159 leak records (lesser variables increases the number of complete data sets in some instances) and the results yielded an $R^2 = 0.0960$.

For the Reference Case the regression equation takes the following form:

(Cumulative total leaks) = (Coefficient)(Material) + (Coefficient)(Year Installed) + (Coefficient)(Pressure) + (Coefficient)(Depth) + Constant

The regression model is assumed to hold for all observations. The coefficients do not change from observation to observation but the values of the independent variable and the dependent variables do change.

## III. REFERENCE CASE RESULTS OF MULTIVARIATE REGRESSION ANALYSIS TO THE VEDI-S DISTRIBUTION SYSTEM

The Reference Case regression analysis generated the coefficient values (m-values) which were then applied against the values of the independent variables (x-values) in accordance with the general equation presented above. The resulting coefficients are presented below.

### BS and CI Mains VEDI-S

Dependent Variable: Total Leaks

Independent Variables listed in order of statistical significance:

| Variable | Coefficient | Confidence Level |
|---|---|---|
| Pipe Material Code | 0.3911 | 95% |
| Year Installed | -0.0219 | 95% |
| Pressure Code | -0.2555 | 95% |
| Depth Code | -0.1759 | 95% |
| Constant | 43.8280 | N/A |
| $R^2 = 0.0960$ | | |

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The classification codes for the independent variables are fully described in the table heading of the Regression Score Results for the Reference Case.

To follow through with the methodology, the resulting regression equation was applied to the VEDI-S defined segment identification database, comprised of 5,763 individual segment records for CI and BS mains, ranking the individual segments. The ranking were then unitized by the segment length to achieve a risk score per mile of segment. In this manner, the high risk mains and shortest segment lengths are combined such that segments of pipe with potential leaks can be replaced in a more cost effective manner during the early years of the program. Graphical representations of ranking vs. main length have also been included for three different lengths of cumulative main. Segment locations are coded in the GIS data base, and therefore were unidentifiable to Stone & Webster Consultants. We recommend the use of this risk ranking by VEDI-S in establishing the logical and economic grouping of segments for replacement. In formulating scheduled work it is important to incorporate knowledge of local authorities, highway agencies, the presence of other buried utilities or other construction programs.

## IV.Supplemental Review

From data reported in VEDI-S's annual DOT reports, the recent history of VEDI-S gas mains inventory is shown in Table 1 and Figure 1, below.

**Table 1**

| Total VEDI-S Miles of Mains | | | | | |
|---|---|---|---|---|---|
| Year | Cast Iron | Bare Steel | Prot Steel | Plastic | Total |
| 1990 | 237 | 112 | 1,148 | 655 | 2,162 |
| 1991 | 231 | 111 | 1,053 | 752 | 2,157 |
| 1992 | 228 | 111 | 1,060 | 871 | 2,279 |
| 1993 | 223 | 182 | 986 | 953 | 2,353 |
| 1994 | 220 | 176 | 992 | 1,026 | 2,422 |
| 1995 | 215 | 164 | 1,010 | 1,110 | 2,506 |
| 1996 | 210 | 157 | 1,012 | 1,275 | 2,659 |
| 1997 | 197 | 155 | 1,018 | 1,319 | 2,689 |
| 1998 | 195 | 150 | 1,043 | 1,363 | 2,751 |
| 1999 | 184 | 149 | 1,044 | 1,427 | 2,804 |
| 2000 | 180 | 133 | 1,043 | 1,468 | 2,824 |
| 2001 | 172 | 131 | 1,043 | 1,515 | 2,861 |
| 2002 | 168 | 128 | 1,042 | 1,553 | 2,891 |
| 2003 | 166 | 124 | 1,041 | 1,591 | 2,922 |
| 2004 | 164 | 123 | 1,042 | 1,616 | 2,945 |
| 2005 | 160 | 119 | 1,043 | 1,710 | 3,032 |

The data confirms that plastic pipe has been used over the past 15 years to meet the system growth and replacement needs. Over the same period, through replacement CI and BS mains have been slowly declining. As a result the proportion of the system made up of CI and BS has fallen to approximately 9%. This is shown in the pie chart, Figure 1, below.

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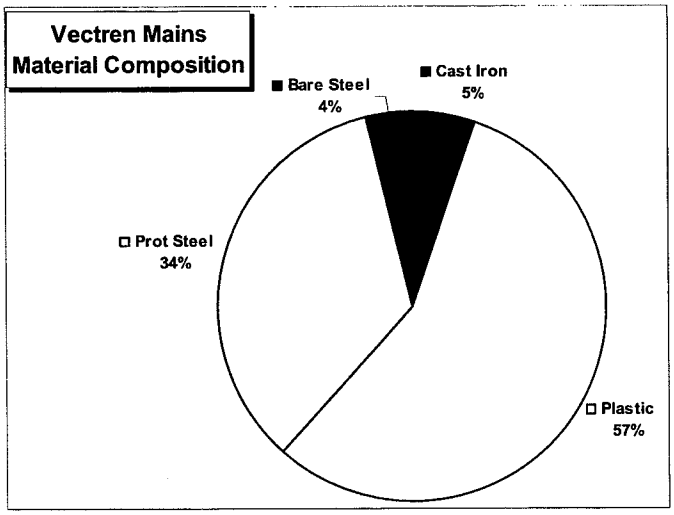
**Figure 1**



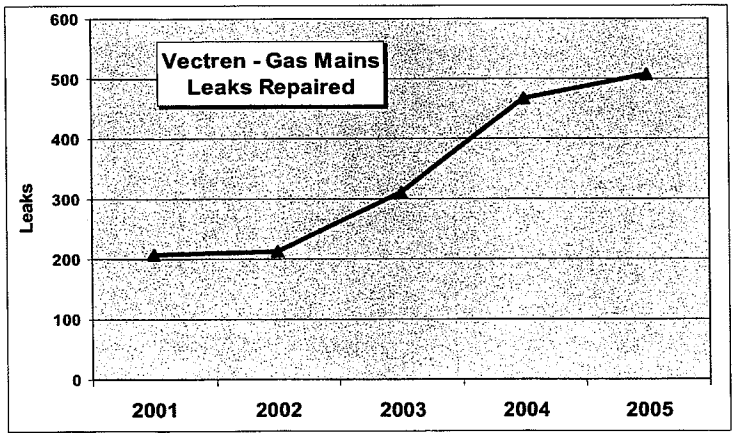

Also, from DOT reports, the recent history of leaks repaired on VEDI-S gas mains is shown in Table 2 and in Figure 2, below.

**Table 2**

| VEDIS - S Gas Mains Leaks Repaired | |
|---|---|
| 2001 | 207 |
| 2002 | 213 |
| 2003 | 311 |
| 2004 | 467 |
| 2005 | 508 |

The data on mains leak repairs reveals an increasing trend in leak rates over the past five years. This evidences the need to implement a formal BS and CI replacement program that prioritizes the most leak vulnerable mains to prevent increasing leaks on the system.

**Figure 2**



## Vectren South Potential Maintenance Expense Reduction

### Meter Order Management

| Meter Orders | 2003 | 2004 | 2005 | Average |
|---|---|---|---|---|
| Outside Leaks | 1790 | 2080 | 1971 | 1947 |
| Investigate Gas Emergency | 415 | 536 | 593 | 515 |
| No Gas | 711 | 709 | 533 | 651 |
| Total | 2916 | 3325 | 3097 | 3113 |
| Orders applicable to BS/CI | 991 | 1430 | 1208 | 1210 |

* Used actual percentage of BS/CI leaks to total leaks repaired (34% - 2003, 43% - 2004, 39% - 2005)

| Maintenance Expenses | 2003 | 2004 | 2005 | Average |
|---|---|---|---|---|
| Total Meter Orders | 94184 | 78082 | 84744 | 85670 |
| Meter Order Mgmt Actuals | $ 2,207,574 | $ 1,498,565 | $ 1,684,963 | $ 1,797,034 |
| Average Cost per Order | 23.44 | 19.19 | 19.88 | 20.84 |
| Average cost per Asset Condition based Order | 46.88 | 38.38 | 39.77 | 41.68 |

* Leak Investigation order averages approximately 2x's longer than average meter order

| Maintenance Expenses Reduction Opportunity | 2003 | 2004 | 2005 | Average |
|---|---|---|---|---|
| Orders Applicable to BS/CI x Average Order Cost per Asset Condition based Order | **$ 46,477** | **$ 54,880** | **$ 48,030** | **$ 50,414** |

### Leak Repair & Management

| Service Leaks Maintenance Expenses | 2003 | 2004 | 2005 | Average |
|---|---|---|---|---|
| Service Leak Repair Actuals | $ 371,498 | $ 428,127 | $ 419,376 | $ 406,334 |
| % of Service BS/CI Leak Repairs | 30% | 39% | 33% | 34% |
| Service Maintenance Expenses attributable to BS/CI | $ 111,524 | $ 167,911 | $ 137,891 | $ 138,316 |

| Main Leaks Maintenance Expenses | 2003 | 2004 | 2005 | Average |
|---|---|---|---|---|
| Total Main Leak Repair Actuals | $ 311,346 | $ 681,389 | $ 557,451 | $ 516,729 |
| Cost Associated with Soft Surface Repairs | $ 93,404 | $ 204,417 | $ 167,235 | $ 155,019 |
| % of BS/CI Leak Repairs in Soft Surface | 49% | 38% | 42% | 43% |
| Cost Associated with Hard Surface Repairs | $ 217,942 | $ 476,972 | $ 390,216 | $ 361,710 |
| % of Below Ground Main BS/CI Leak Repairs | 56% | 63% | 60% | 60% |
| Main Maintenance Expenses attributable to BS/CI | $ 167,909 | $ 378,110 | $ 304,368 | $ 282,515 |

| O&M Expenses Reduction Opportunity | 2003 | 2004 | 2005 | Average |
|---|---|---|---|---|
| Total Main Leak Reduction Opportunity | **$ 279,433** | **$ 546,021** | **$ 442,259** | **$ 420,830** |

| TOTAL POTENTIAL MAINTENANCE SAVINGS | 2003 | 2004 | 2005 | Average |
|---|---|---|---|---|
| | **$ 325,909** | **$ 600,901** | **$ 490,290** | **$ 471,245** |

* Expected Annual Savings reflects savings incurred when all mileage has been replaced.
* Work units and costs generated from historical actuals

Petitioner's Exhibit No. JMF-10
Vectren South
Page 1 of 1

# Vectren South
# Pipeline Safety Adjustment - Actual Deferred Expenses
# April 1, 2005 - March 31, 2006

| Line No. | (A) Month | (B) Actual Deferred Incremental Expenses |
|---|---|---|
| 1 | April 2005 | $ 59,653 |
| 2 | May 2005 | $ 132,204 |
| 3 | June 2005 | $ 96,525 |
| 4 | July 2005 | $ 155,160 |
| 5 | August 2005 | $ 128,927 |
| 6 | September 2005 | $ 25,269 |
| 7 | October 2005 | $ 63,143 |
| 8 | November 2005 | $ 46,356 |
| 9 | December 2005 | $ 200,761 |
| 10 | January 2006 | $ 38,975 |
| 11 | February 2006 | $ 129,906 |
| 12 | March 2006 | $ 118,886 |
| 13 | Total Expenses | $ 1,195,765 |

**Pipeline Safety Improvement Act of 2002**
**2005 Integrity Management Program Estimate compared to Period Ending March 31, 2006 Actuals**
**Vectren South**

| | | Estimate | Actuals |
|---|---|---|---|
| **Item** | **Category** | **2005** | **Period Ending March 31, 2006** |
| | | | |
| Corrosion Surveys/Direct Exams/Confirmatory Direct Assessment (CDA) | Assessment | $101,773 | $304,046 |
| | | | |
| Data Integration | Data Integration | $5,532 | $61,714 |
| | | | |
| DA-Verification Digs | Assessment | $425,634 | $594,966 |
| | | | |
| Data Storage | | | |
| Annual Costs-O&M | Data | $5,517 | $0 |
| | | | |
| Program Audits/Review | Program Management | $2,785 | $3,894 |
| | | | |
| HCA Identification-Maint. | Data Integration | $3,325 | $0 |
| | | | |
| Risk Assessment-Maint. | Program Management | $3,879 | $0 |
| | | | |
| Training/Data Interpretation - 5-year intervals | Program Management | $0 | $4,229 |
| | | | |
| Enhanced Prev. &Mit. Program | Assessment | $130,381 | $6,190 |
| | | | |
| IMP Crew Training/Annual Refresher | Program Management | $1,967 | $0 |
| | | | |
| Material Identification (ATC & Lab Costs) | Data | $115,957 | $0 |
| | | | |
| Qualification Programs | Program Management | $7,857 | $0 |
| | | | |
| Materials and Supplies | Program Management | $1,978 | $0 |
| | | | |
| Engineering - Project Coordination | Program Management | $82,080 | $37,884 |
| | | | |
| ROW Maintenance | Assessment | $236,458 | $177,474 |
| | | | |
| Maps - NPMS-Maint | Program Management | $2,205 | $30 |
| | | | |
| Public Awareness Programs | Program Management | $2,321 | $5,338 |
| | | | |
| | | | |
| **Total Costs** | | **$1,129,649** | **$1,195,765** |

Petitioner's Exhibit No. JMF-12
Vectren South
Page 1 of 1

**Pipeline Safety Improvement Act of 2002**
**2005 Integrity Management Program Expenses by Work Category**
**Vectren South**

| Category | Actuals |
|---|---|
| Assessments | $ 1,082,676 |
| Data Integration | $ 61,714 |
| Program Management | $ 51,375 |
| April 1, 2005 through March 31, 2006 Actual Expenses | $ 1,195,765 |

**Pipeline Safety Improvement Act of 2002**
**Integrity Management Program Estimate for Period April 1, 2006 through March 31, 2007**
**Vectren South**

| Item | Estimate Period Ending March 31, 2007 |
|---|---|
| | |
| Corrosion Surveys/Direct Exams/Confirmatory Direct Assessment (CDA) | $386,579 |
| | |
| Data Integration | $127,492 |
| | |
| DA-Verification Digs | $227,653 |
| | |
| Data Storage | |
| Annual Costs-O&M | $2,578 |
| | |
| Program Audits/Review | $6,803 |
| | |
| HCA Identification-Maint. | $3,528 |
| | |
| Risk Assessment-Maint. | $1,884 |
| | |
| Training/Data Interpretation - 5-year intervals | $5,450 |
| | |
| Enhanced Prev. &Mit. Program | $65,291 |
| | |
| IMP Crew Training/Annual Refresher | $4,194 |
| | |
| Material Identification (ATC & Lab Costs) | $179,193 |
| | |
| Qualification Programs | $8,336 |
| | |
| Materials and Supplies | $1,830 |
| | |
| Engineering - Project Coordination | $226,796 |
| | |
| ROW Maintenance | $105,000 |
| | |
| Maps - NPMS-Maint | $2,385 |
| | |
| Public Awareness Programs | $44,900 |
| | |
| | |
| **Total Costs** | **$1,399,892** |

**SOUTHERN INDIANA GAS AND ELECTRIC COMPANY**
**d/b/a VECTREN ENERGY DELIVERY OF INDIANA, INC.**
**(VECTREN SOUTH-GAS)**

**IURC CAUSE NO.** 43112

# DIRECT TESTIMONY
# OF
# JOHN P. KELLY

# ON

# REPLACEMENT COST VALUATION

**SPONSORING PETITIONER'S EXHIBITS JPK-1 THROUGH JPK-4**

**Direct Testimony of John P. Kelly**

**Q. Please state your name, affiliation, business and occupation address.**

A. My name is John P. Kelly. I am an Executive Advisor for Concentric Energy Advisors ("CEA"), located at 313 Boston Post Road West, Marlborough, Massachusetts, 01752. I am a registered professional engineer, a certified real estate appraiser and a specialist in asset valuation.

**Q. On whose behalf are you submitting this direct testimony?**

A. I am submitting this testimony on behalf of Southern Indiana Gas and Electric Company d/b/a Vectren Energy Delivery of Indiana, Inc. ("Vectren South" or the "Company"). CEA was engaged by Vectren South to perform a study of the current value of its gas utility assets.

**Q. Please describe the nature of the services provided by CEA.**

A. CEA provides consulting services to utilities, energy producers, major energy consumers, project developers, and governmental authorities throughout North America. The firm specializes in transaction-related financial advisory services, valuation studies, economic feasibility studies, energy market and regulatory strategies, market assessments, energy commodity contracting and procurement, regulatory and litigation support, and capital market analyses and negotiations.

**Q. Please describe your professional experience.**

A. Prior to my current position at CEA, I was a Director of Navigant Consulting, Inc. I was employed at Stone & Webster, Inc., most recently serving as Vice President and Director of Stone & Webster Management Consultants and Assistant Vice President of Stone & Webster Engineering Corporation. I have over 35 years of experience in valuations and studies of public utility and industrial properties for rate-making, purchase and sale considerations, eminent domain/condemnation, ad valorem tax assessments, insurance, accounting and financial purposes. I have provided expert testimony on valuation matters in more than 40 cases before state utility commissions, federal and state courts,

and administrative bodies throughout the United States. A summary of my professional experience and educational background is attached as Petitioner's Exhibit JPK-2.

**Q. What are your responsibilities as an Executive Advisor at CEA?**

A. I manage projects involving the valuation of utility property.

**Q. What is the purpose of your testimony?**

A. The purpose of my testimony is to express my opinion as to the current value of Vectren South's gas utility assets and to describe the valuation study upon which my opinion is based.

**Q. What conclusion have you reached regarding the current value of Vectren South's gas utility assets?**

A. In my opinion, the value of Vectren South's gas utility assets, as of March 31, 2006, is approximately $242.8 million, as measured by the replacement cost of the property less depreciation and $172.7 million after making a special adjustment for technological change.

**Q. Please describe Vectren South's gas utility assets.**

A. Vectren South's transmission and distribution system is comprised of approximately 3,000 miles of mains and over 100,000 services. The Company also has three underground gas storage fields. Vectren South's general plant accounts include those assets that are not defined by the FERC Uniform System of Accounts as includable in other plant accounts.

More specifically, the general plant accounts contain the following categories of assets not elsewhere classified:

- Land and land rights
- Structures and improvements
- Transportation equipment including automobiles, trucks and appurtenant equipment
- Stores, shop and laboratory equipment

- Power operated equipment that is self-propelled or mounted on moveable equipment
- Communication equipment

Vectren South also maintains general plant accounts for assets that are used in common for both Electric and Gas utility services. This property has been allocated accordingly and includes items comparable to those described above.

**Q. What gas in underground storage have you indicated included in your valuation?**

A. I have included Nonrecoverable natural gas included within Account 352.3. This is cushion gas in underground storage that would not be recoverable if use of the storage field were to be discontinued. Under the Uniform System of Accounts this gas is capitalized and considered to be part of utility plant in service. Nonrecoverable gas was included at its original cost which is a conservative estimate of the value of this asset since the current cost of natural gas is significantly greater than the original cost.

**Q. What are some of the records about Vectren South's gas utility assets that you reviewed in order to develop an opinion as to their value?**

A. I reviewed an extensive amount of information about Vectren South's gas utility assets including the Company's continuing property records, annual reports to the U.S. Department of Transportation for both the transmission and distribution systems, leak reports to the Indiana Utility Regulatory Commission, and Vectren South's FERC Form No. 2 filed with the Federal Energy Regulatory Commission.

**Q. Have you physically inspected the assets?**

A. Yes. I have physically inspected Vectren South's facilities from the standpoint of preparing an estimated valuation of the facility based on the general operating characteristics of the facilities. As part of the valuation, I have discussed the operations of the facilities with Company personnel to determine whether there are any material factors that would need to be considered as part the overall valuation.

**Q. Please indicate when you inspected Vectren South's facilities and your observations regarding the condition and usefulness of the facilities.**

A. Physical inspections were conducted during the week of May 22, 2006. It is my general conclusion that the physical plant and properties in service are well designed and consist of modern equipment and quality material, that the properties are being maintained and operated on a coordinated and highly efficient basis, and that for the foreseeable future, the properties can continue to operate effectively for the purposes for which they have been designed and constructed.

**Q. Have you had any experience in the past with the evaluation of Vectren South's assets?**

A. Yes. I testified on behalf of Vectren South in prior electric and gas rate proceedings.

**Q. In your opinion have you studied Vectren South's gas utility assets in sufficient detail to render an opinion as to their value?**

A. Yes.

**Q. What approach did you use to value Vectren South's gas utility assets?**

A. I determined the value of Vectren South's assets using the Current Cost Approach.

**Q. Please explain the Current Cost Approach used to value assets.**

A. There are generally two ways in which the Current Cost Approach can be conducted, i.e., (i) determining the cost of reproducing a duplicate asset using the same material and design at current prices, less loss in value from depreciation ("Reproduction Cost Method") or (ii) determining the cost of replacing the subject asset at current prices with an economical and efficient present day functional equivalent, less loss in value from depreciation ("Replacement Cost Method").

**Q. The Reproduction Cost Method and the Replacement Cost Method both use costs at current prices. Would either gross original cost or original cost less accounting depreciation (i.e., net original cost) be a valid measure of the value of Vectren South's gas utility assets?**

A. No. Original cost represents the historical cost incurred when the assets were originally constructed or acquired. Due to inflation, the cost to reproduce or replace assets today will be substantially different. Vectren South's gas utility system has been constructed over many years, and the original cost of the gas utility assets is well below the value of the assets today.

**Q. Will the Reproduction Cost Method and Replacement Cost Method ever produce the same result?**

A. Yes. If an asset would be replaced today in substantially the same form as currently exists, the reproduction cost and replacement cost will be the same.

**Q. How did you apply the Current Cost Approach in valuing Vectren South's gas utility assets?**

A. I sought to determine the replacement cost less depreciation of Vectren South's gas utility properties. To the extent I concluded the assets would be replaced today in substantially the same form, I utilized the Reproduction Cost Method because that method would also derive the replacement cost. In cases where I concluded assets would be replaced in a different form, I have made adjustments to the reproduction cost results to derive a reasonable replacement cost.

**Q. Please explain how the Reproduction Cost Method is applied.**

A. The Reproduction Cost Method takes the original cost, by vintage, of each gas utility plant account and then applies an adjustment factor (or multiplier) to each vintage of each account to determine the cost to reproduce those assets at today's dollars. This value is commonly referred to as the Reproduction Cost New of the assets. The adjustment factor or multiplier is utilized to account for the cost of those gas utility assets that a third party would have to expend currently if it were to reproduce the gas utility system as it was originally constructed.

**Q. How have you determined the replacement cost of Vectren South's gas utility assets?**

A. Once the Reproduction Cost New was calculated for each account, by vintage, for all of the gas utility assets, a downward adjustment was made to reflect any loss in service value due to the age and the condition of the assets. As part of this adjustment, I considered what assets would be replaced today with functionally-equivalent but different assets. I also made a special technology adjustment recommended by witness Paul Moul. This results in the Replacement Cost New Less Depreciation value for the assets.

**Q. Please describe Petitioner's Exhibits JPK-3 and JPK-4.**

A. Petitioner's Exhibit JPK-3 provides the results of and supporting calculations for the Replacement Cost Study I made of Vectren South's gas utility assets. Page 1 of Petitioner's Exhibit JPK-3 is a summary of the results of this study. The first page of the exhibit shows, by FERC plant account, the total gross original cost of the assets, the Reproduction Cost New of the assets, the percent condition of the assets (which has been adjusted to reflect the replacement of certain assets with different but functionally equivalent assets), and the Replacement Cost New Less Depreciation of the assets with and without the technology adjustment. The remaining pages of Petitioner's Exhibit JPK-3 provide the original cost and adjustment factor, by vintage year, utilized to calculate the Reproduction Cost New for each of Vectren South's gas utility accounts.

Finally, Petitioner's Exhibit JPK-4 shows the allocation of Common Plant to the electric and gas utilities for the original cost and the current cost of each Common Plant account. The allocations are based on the company's allocation of 85% electric plant and 15% gas plant as reported in the Company's FERC Form 1 filing.

**Q. To determine the Reproduction Cost New, you need original cost information for each plant account by vintage year. Does Vectren South have such plant account information in sufficient detail?**

A. Yes. Vectren South maintains its gas plant property records according to the Uniform System of Accounts prescribed by the Federal Energy Regulatory Commission, by vintage year. These records are the source of the original cost information used in my valuation and were sufficient to conduct my Reproduction Cost Study of Vectren South's gas utility assets.

**Q. How are the adjustment factors or multipliers determined that are applied to the original costs, by vintage year, in each account?**

A. For the majority of Vectren South's gas utility asset accounts, I utilized the Handy-Whitman Index of Public Utility Construction Costs ("Handy-Whitman Index") to determine the present day reproduction costs for each vintage of assets. The Handy-Whitman Index is a generally accepted industry standard for conducting reproduction cost studies, is considered an accurate and reliable resource for valuation experts, has a long history of providing dependable data, and has been published continuously since 1924 by Whitman, Requardt and Associates, an engineering firm.

**Q. For what purposes is the Handy-Whitman Index commonly used?**

A. The Handy-Whitman Index has been used and is generally accepted for rate setting purposes, as well as for many other purposes. For example, it has been used to value utility property for sale purposes, perform stock valuations, and for ad valorem tax calculations. In addition, the Handy-Whitman Index has been used for insurance purposes and for engineering estimates of new construction project costs.

**Q. How long have you used the Handy-Whitman Index to value utility property?**

A. I have utilized the Handy-Whitman Index throughout my career as part of my valuation assignments.

**Q. How does the Handy-Whitman Index account for changes in construction costs over time?**

A. The Handy-Whitman Index has tracked utility labor, materials and equipment costs over time and has developed indices that reflect the percentage change in the cost of goods in most utility plant accounts for every year from 1912 through the present. Specifically, the Handy-Whitman Index provides a cost index for every year for different types of utility assets as compared to a base year of 1973. For example, if certain assets purchased in 1973 had an index cost of 100, assets purchased in 1923 may have an index of 20, while assets purchased in 2002 may have any index of 220. Using the Handy-Whitman Index, the adjustment factor is calculated by dividing the index for the most recent period by the index for the vintage of the property in question. Therefore, in this example, the adjustment factor for the assets installed in 1923 would be 11 (i.e., the 2002 index of 220 divided by the 1923 index of 20). For property installed in 1973, the adjustment factor would be 2.2 (220 divided by 100).

**Q. As an example, please explain how you used the Handy-Whitman Index to calculate the Reproduction Cost New of the assets in Account No. 367 – Transmission Plant - Mains.**

A. As shown in Petitioner's Exhibit JPK-3, page 4 Vectren South installed Account No. 367 property in years spanning 1953 through 2006. First, the vintage and original cost of this property is shown in columns (c) and (d), respectively. These figures are taken directly from Vectren South's property records. Second, the adjustment factor for each vintage of each account is shown in column (e). The adjustment factors for Account No. 367 are calculated as I have described. For example, the Handy-Whitman Index provides a 1953 cost index for Account No. 367 property of 41, and a January 1, 2006 cost index for the same property of 434. The adjustment factor for the Account No. 367 property installed in 1953, of 10.585, is calculated by dividing the January 1, 2006 cost index by the 1953 cost index (434 divided by 41). Lastly, the Reproduction Cost New value for each vintage of Account No. 367 is found in column (f) and is calculated by multiplying the original cost by the adjustment factor.

**Q. Do the adjustment factors from the Handy-Whitman Index you used apply to the area in which Vectren South's gas utility assets are located?**

A. Yes. The Handy-Whitman Index provides separate adjustment factors for various parts of the United States in order to reflect the differences in regional cost changes. As such, I have utilized the figures from the Handy-Whitman Index for the North Central region of the United States, which includes Indiana.

**Q. What is the date as of which the Handy-Whitman Index used in your study is applicable?**

A. The data I used from the Handy-Whitman Index is as of January 1, 2006. The January 1, 2006 published numbers were adopted as being reflective of the price levels at March 31, 2006.

**Q. Did you utilize the Handy-Whitman Index for all of Vectren South's accounts?**

A. No. There were two (2) primary instances in which the Handy-Whitman Index did not provide me the necessary information. First, the Handy-Whitman Index does not provide data on the value of land or easements. For land, land rights and easements, I utilized index numbers of Indiana farm real estate compiled by the United States Department of Agriculture.

Second, the Handy-Whitman Index does not have reproduction cost information covering all of Vectren South's general asset accounts. In those few instances, I have utilized the percent changes stated in the Bureau of Labor Statistics' Producer Price Index ("PPI") as a proxy for the cost changes in those assets over time. Similar to the Handy-Whitman Index, the Bureau of Labor Statistics tracks price changes for various asset categories, including those assets for which there was no information available from the Handy- Whitman Index. The Bureau of Labor Statistics does not calculate PPI back far enough to cover all vintages of Vectren South's assets. Therefore, I used the PPI information for the vintages for which there was data, and utilized the percent changes in Gross Domestic Product ("GDP") as a proxy for those vintages for which there was no information available from PPI. Finally, I included non-recoverable gas at original cost.

**Q. Did the use of the PPI and GDP adjusted figures to calculate the percent changes in the cost of certain vintages of general plant assets have a significant impact on the overall results?**

A. No. First, there were very few accounts that the Handy-Whitman Index did not cover. Secondly, the amount of dollars in the accounts for which I utilized PPI and/or GDP were small compared to the dollars in accounts covered by the Handy-Whitman Index. Therefore, these assumptions had a relatively small impact on the overall results of my study.

**Q. Once you adjusted each account, by vintage, to reflect the present day reproduction cost for those assets (i.e., Reproduction Cost New), why was it necessary to calculate the loss in value of those assets due to age and condition?**

A. Property is desired because of the useful service obtainable from it. The value of property, therefore, is affected by its ability to produce some kind of useful service during its expected future life in service. This requires an adjustment to the Reproduction Cost New for the age and condition of property being valued.

**Q. How was the adjustment calculated to reflect the age and condition of the gas utility assets?**

A. The necessary adjustment to reflect the age and condition of the assets was essentially conducted in three steps. The first step was to determine the average service life for each asset account. I based the average service life for each asset account on the depreciation rates utilized by Vectren South.

The second step was to calculate the estimated remaining useful life of the assets in each account. After obtaining the average service life for each account, I then calculated an average weighted age of the assets in each account based on the present dollars of those assets by vintage as calculated in the Reproduction Cost Study described above.

For the third step, I determined the condition percent of the assets in each account. This determination is based on the "Condition-Percent Tables for

Depreciation of Unit and Group Properties" by Robley Winfrey. These tables are published by Iowa State University. The condition percent of the assets in each account is calculated by dividing (i) the present value of the benefits of those same assets based on their remaining useful life by (ii) the present value of the benefits of the assets in each account based on their full average service life.

**Q. What adjustments did you make for assets that would be reflected today by different but functionally equivalent assets?**

A. From my analysis of Vectren South's property, I concluded that the system would be replaced today in substantially the same manner, with two exceptions. First, Vectren South's system includes some low-pressure cast iron mains that would be replaced today with small diameter pipe. Second, Vectren South's system includes some steel mains and services that would be replaced today with plastic pipe. Therefore, adjustments were made to Acct. 376 – Mains and Acct. 380 - Services to reflect these forms of functional depreciation.

**Q. Please describe the adjustments that you made to these two accounts?**

A. Approximately 10% of the distribution mains are low-pressure cast iron. This pipe would be replaced today at an intermediate pressure resulting in smaller diameter pipe. Indeed, Vectren South has had an aggressive cast iron main replacement program that commenced in the early 1990s. I was able to calculate the equivalent length of pipe that would be represented by the replacement. This translated to a functional depreciation of 50% for the cast iron mains. Steel main, 8" in diameter and less, would be replaced today by plastic mains. These mains comprise 38% of the distribution mains. It is estimated that the cost of the material and labor to install steel mains is approximately two times the cost for plastic mains. This translates into a functional depreciation of 50%. The resultant weighted functional condition for the distribution mains was calculated to be 76%, or 24% functional depreciation. A similar adjustment was made to the services account to recognize that steel services less than 1" in diameter would be replaced with plastic services. These services comprise 41% of the services. Like the mains the functional condition of these services is 50%.

The resultant functional condition of the account is 80%, or 20% functional depreciation.

**Q. Are any other adjustments reflected in the condition percent figures shown in Petitioner's Exhibit JPK-3?**

A. Yes. I made an allowance for piecemeal construction for distribution mains and services. Construction of property in installments as compared to a continuous single construction effort is considered to be piecemeal construction. The unit cost for a major construction effort tends to be less because of the decreased mobilization cost per unit. To account for this decreased cost, I made a 10% downward adjustment to the distribution mains account and a 5% downward adjustment to the services account.

**Q. How did you then calculate the Replacement Cost New Less Depreciation?**

A. The last step was to multiply the total Reproduction Cost New of the assets in each account by the percent condition of those assets to arrive at the Replacement Cost New Less Depreciation value.

**Q. What are the results of your Replacement Cost Study?**

A. The results of my Replacement Cost Study of Vectren South's gas utility assets are shown in Petitioner's Exhibit JPK-3. As shown in Petitioner's Exhibit JPK-3, I have calculated a Reproduction Cost New value of approximately $423.3 million, a Reproduction Cost New Less Depreciation value of approximately $242.8 million.

**Q. Did you make any other adjustments to your results?**

A. Yes. As discussed in Mr. Moul's testimony, to make sure the effect of technological change on the value of the assets was not understated, I made a further adjustment to reduce the RCNLD balances for the property plant and equipment, excluding land, of 2.25% per year from the date of installation. This additional adjustment results in an RCNLD value of $172,761,514, as shown in the far right hand column of Petitioner's Exhibit JPK-3.

**Q. Does this conclude your direct testimony in this proceeding?**

A. Yes.

# John P. Kelly
# Executive Advisor

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Mr. Kelly is a Valuation Consultant with over 35 years of wide experience in valuations and studies of public utility and industrial properties for rate-making, purchase and sale considerations, eminent domain/condemnation, ad valorem tax assessments, insurance, accounting, and financial purposes.

Mr. Kelly has been responsible for the development of value for electric, gas, telephone, water and steam utilities, and for many types of industrial properties. He has testified before utility commissions, federal and state courts, and before administrative bodies on more than 45 occasions. In addition to his valuation experience, he has also been appointed and approved to prepare independent engineer's certificates relative to valuation matters by numerous utility companies, trustees, and banks.

These assignments have been carried out throughout the United States, Puerto Rico, the U.S. Virgin Islands, and in the following foreign countries: Brazil, Canada, India, New Zealand, Peru and Venezuela.

Prior to his valuation experience, Mr. Kelly was responsible for reviewing for approval, the proposed construction of outside plant by New England Telephone Company. As an undergraduate, he was employed by New England Power Service Company and Doble Engineering Company.

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## PROFESSIONAL HISTORY

**Concentric Energy Advisors, Inc. (2003 – Present)**
Executive Advisor

**Navigant Consulting, Inc. (2000 - 2003)**
Director

**Stone & Webster Management Consultants, Inc. (1964 – 2000)**
Senior Vice President
Vice President
Senior Appraisal Engineer
Appraisal Engineer

**New England Telephone Company (1963 – 1964)**
Supervisory Assistant – Outside Plant

**Doble Engineering Company (1959-1963)**
Intern – Research & Development

**New England Power Service Company (1958-1959)**
Intern – Transmission Engineering

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## PROFESSIONAL LICENSE

Registered Professional Engineer – State of Maine, License No. 5148
Certified General Real Estate Appraiser:

- Commonwealth of Massachusetts, License No. 209
- State of Maine, Certificate No. CG 1342
- State of Michigan, Permanent I.D. No. 1201071037
- State of New York, I.D. No. 4600003621

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## ASSOCIATION MEMBERSHIPS

American Society of Appraisers, Accredited Member
Eta Kappu Nu – Electrical Engineering Honor Society
American Water Works Association

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## EDUCATION

Northeastern University, BS, Electrical Engineering, 1963
Northeastern University, Graduate School of Engineering, 1968
University of Southern Maine – Uniform Standards of Professional Appraisal Practice
Appraisal Institute – Real Estate Appraisal Principles
Appraisal Institute – Basic Valuation Procedures
Appraisal Institute – Capitalization Theory and Techniques, Part A
Appraisal Institute – Capitalization Theory and Techniques, Part B
Appraisal Institute – Case Studies in Real Estate Valuation
Appraisal Institute – Standards of Professional Practice Parts A and B
Appraisal Institute – Highest & Best Use and Market Analysis
American Society of Appraisers – National Uniform Standards of Professional Appraisal Practice
Appraisal Institute – General Applications
Appraisal Institute – Standards of Professional Practice, Part C

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# Expert Testimony Of John P. Kelly

| YEAR | CASE | PURPOSE | HEARD BY |
|---|---|---|---|
| 1975 | Indianapolis Power & Light Co. | Valuation and Rate Base | P.U.C. (IN) |
| 1976 | Indianapolis Power & Light Co. | Valuation and Rate Base | P.U.C. (IN) |
| 1978 | Indianapolis Power & Light Co. | Valuation and Rate Base | P.U.C. (IN) |
| 1978 | Montaup Electric Co. | Ad Valorem Taxes<br>City of Fall River | Appellate Tax Board (MA) |
| 1979 | Niagara Mohawk Power Corp. | Condemnation Town of Massena | St. Lawrence County Supreme Court (NY) |
| 1980 | Niagara Mohawk Power Corp. | Condemnation Town of Massena | St. Lawrence County Supreme Court (NY) |
| 1981 | Boston Edison Co. | Ad Valorem Taxes<br>City of Somerville | Appellate Tax Board (MA) |
| 1981 | Indianapolis Power & Light Co. | Valuation and Rate Base | P.U.C. (IN) |
| 1982 | Southern Indiana Gas & Electric Co. | Valuation and Rate Base | P.U.C. (IN) |
| 1982 | Indianapolis Power & Electric Co. | Valuation and Rate Base | P.U.C. (IN) |
| 1982 | Southern Indiana Gas & Electric Co. | Valuation and Rate Base | P.U.C. (IN) |
| 1983 | Massachusetts Electric Company | Ad Valorem Taxes City of Quincy | Appellate Tax Board (MA) |
| 1983 | New England Power Company | Ad Valorem Taxes<br>City of Quincy | Appellate Tax Board (MA) |
| 1983 | Boston Edison Company | Ad Valorem Taxes<br>City of Watertown | Appellate Tax Board (MA) |
| 1984 | Automatic Comfort Corporation | Stockholders' Suit | Board of Arbitration<br>(Hartford, CT) |
| 1984 | Seabrook Station | Ad Valorem Taxes<br>Town of Seabrook | Superior Court (NH) |
| 1984 | Boston Edison Company | Ad Valorem Taxes<br>City of Boston | Appellate Tax Board (MA) |
| 1985 | Granite State Gas Transmission Company | Ad Valorem Taxes<br>Town of East Kingston | Board of Land and Tax Appeals (NH) |
| 1985 | Hunt Energy Company | Bankruptcy | U.S. Bankruptcy Court for Northern Ohio |
| 1985 | Indianapolis Power & Light Co. | Valuation and Rate Base | P.U.C. (IN) |

# Expert Testimony Of John P. Kelly

| YEAR | CASE | PURPOSE | HEARD BY |
|---|---|---|---|
| 1986 | New England Power Company | Ad Valorem Taxes<br>Town of Hartford | Windsor County Superior Court (VT) |
| 1986 | Seabrook Station | Ad Valorem Taxes<br>Town of Seabrook | Superior Court (NH) |
| 1986 | Ohio Edison Co. | Condemnation | Public Hearing<br>(Marion, OH) |
| 1986 | Northern Indiana<br>Public Service Co. | Valuation and Rate<br>Base | P.U.C. (IN) |
| 1986 | Clarkston General Water Supply, Inc. | Condemnation | Asotin County<br>Superior Court (WA) |
| 1987 | Dow Chemical Co. | Ad Valorem Taxes | Louisiana Tax Commission |
| 1987 | Orange & Rockland Utilities Company | Ad Valorem Taxes<br>Town of Ramapo | Rockland County<br>Supreme Court (NY) |
| 1987 | Public Service Company of New Hampshire | Ad Valorem Taxes<br>Town of Londonderry | Board of Land and Tax Appeals (NH) |
| 1987 | Northern Indiana Public Service Company | Valuation and Rate Base | Indiana Utility Regulatory<br>Commission |
| 1987 | Cooper Industries Crouse-Hinds Division | Ad Valorem Taxes<br>Town of Salina | Onondaga County Supreme Court<br>(NY) |
| 1988 | Seabrook Station | Ad Valorem Taxes<br>Town of Seabrook | Rockingham County<br>Superior Court (NH) |
| 1989 | Pacific Power & Light Company | Condemnation<br>Alturas, California | U.S. District Court<br>Eastern District of California |
| 1989 | Iowa Public Service Company | Condemnation<br>Sheldon, Iowa | Iowa Public Utilities Board |
| 1990 | San Diego Gas & Electric Company | Condemnation<br>San Juan Capistrano, California | Orange County Superior Court (CA) |
| 1991 | Peoples Natural Gas | Condemnation,<br>Hartley, Iowa | O'Brien County District Court |
| 1991 | Peoples Natural Gas | Condemnation,<br>Everly, Iowa | Clay County District Court |
| 1991 | Boston Edison Company | Ad Valorem Taxes<br>City of Everett | Appellate Tax Board (MA) |

# Expert Testimony Of John P. Kelly

| YEAR | CASE | PURPOSE | HEARD BY |
|---|---|---|---|
| 1992 | Indianapolis Power & Light Company | Valuation and Rate Base | Indiana Utility Regulatory Commission |
| 1993 | Southern New Hampshire Water Company | Ad Valorem Taxes<br>Town of Hudson | Hillsborough County Superior Court (NH) |
| 1993 | San Diego Gas & Electric Co. | Condemnation<br>Oceanside, California | San Diego County Superior Court (CA) |
| 1995 | Ebensburg Power Company | Contract Dispute | Board of Arbitration (Pittsburgh, PA) |
| 1996 | Connecticut Yankee Atomic Power Company | Ad Valorem Taxes<br>Town of Haddam | Middlesex County Superior Court (CT) |
| 1998 | Turners Falls Cogeneration Plant | Ad Valorem Taxes<br>Town of Montague | Appellate Tax Board (MA) |
| 1998 | Public Service Company of Colorado | Asset Transfer | Public Utility Commission of Colorado |
| 1998 | Ohio Edison Company<br>Perry Nuclear Plant | Ad Valorem Taxes | Board of Tax Appeals (OH) |
| 1999 | Pennsylvania Power Company | Ad Valorem Taxes | Lawrence County Board of Assessment Appeals (PA) |
| 1999 | Beaver Valley Nuclear Power Station & Bruce Mansfield Power Plant | Ad Valorem Taxes | Beaver County Board Of Assessment Appeals (PA) |
| 2001 | Northern Indiana Public Service Company | Valuation and Rate Base | Indiana Utility Regulatory Commission |
| 2004 | Indiana Gas Company, Inc. | Valuation and Rate Base | Indiana Utility Regulatory Commission |
| 2004 | Southern Indiana Gas and Electric Co., Inc. | Valuation and Rate Base | Indiana Utility Regulatory Commission |
| 2004 | Frank R. Phillips Power Plant | Ad Valorem Taxes | Court of Common Pleas (Allegheny County, PA) |

# Reproduction Cost Analysis

As of March 31, 2006

| Ferc Account | Account Description | Original Cost | Reproduction Cost New | Percent Condition | RCNLD | Technologically Adjusted RCN | Technologically Adjusted RCNLD |
|---|---|---|---|---|---|---|---|
| 301 | Organization | $ 10,054 | $ 10,054 | 100% | $ 10,054 | $ 10,054 | $ 10,054 |
| 302 | Franchises and consents | $ 454 | $ 454 | 100% | $ 454 | $ 454 | $ 454 |
| | | $ 10,508 | $ 10,508 | | $ 10,508 | $ 10,508 | $ 10,508 |
| | **Natural Gas Production and Gathering Plant** | | | | | | |
| 330 | Producing gas wells construction | $ 29,161 | $ 61,153 | 0% | $ - | $ 36,051 | $ - |
| 331 | Producing gas wells equipment | $ 15,141 | $ 31,752 | 0% | $ - | $ 18,718 | $ - |
| 332 | Producing field lines | $ 9,942 | $ 20,849 | 0% | $ - | $ 12,291 | $ - |
| | | $ 54,244 | $ 113,754 | | $ - | $ 67,060 | $ - |
| | **Underground Storage Plant** | | | | | | |
| 350.1 | Land | $ 6,971,745 | $ 20,910,167 | 100% | $ 20,910,167 | $ 20,910,167 | $ 20,910,167 |
| 352.1 | Storage Leaseholds and Rights | $ 1,087,081 | $ 4,390,526 | 100% | $ 4,390,526 | $ 4,390,526 | $ 4,390,526 |
| 352.3 | Nonrecoverable Natural Gas | $ 483,848 | $ 483,848 | 100% | $ 483,848 | $ 483,848 | $ 483,848 |
| 351 | Compressor Station | $ 320,177 | $ 963,305 | 65% | $ 626,148 | $ 500,351 | $ 325,228 |
| 352 | Wells | $ 1,575,250 | $ 8,934,918 | 33% | $ 2,948,523 | $ 3,618,474 | $ 1,194,096 |
| 353 | Lines | $ 812,245 | $ 3,223,199 | 50% | $ 1,611,600 | $ 1,537,759 | $ 768,879 |
| 354 | Compressor Station Equipment | $ 338,846 | $ 2,897,726 | 6% | $ 173,864 | $ 1,047,403 | $ 62,844 |
| 355 | Measuring and Regulating Equipment | $ 647,086 | $ 1,353,544 | 60% | $ 812,127 | $ 908,406 | $ 545,044 |
| 356 | Purification Equipment | $ 293,373 | $ 701,854 | 29% | $ 203,538 | $ 433,900 | $ 125,831 |
| | | $ 12,529,651 | $ 43,859,088 | | $ 32,160,339 | $ 33,830,835 | $ 28,806,464 |
| | **Transmission Plant** | | | | | | |
| 365.1 | Rights-of-Way | $ 455,649 | $ 710,704 | 100% | $ 710,704 | $ 710,704 | $ 710,704 |
| 365.2 | Transmission Rights-of-Way | $ 1,053,867 | $ 3,341,515 | 100% | $ 3,341,515 | $ 3,341,515 | $ 3,341,515 |
| 366 | Measuring and Regulating Station Structures | $ 223,698 | $ 462,193 | 70% | $ 323,535 | $ 291,519 | $ 204,064 |
| 367 | Mains | $ 23,704,425 | $ 44,117,835 | 81% | $ 35,735,446 | $ 30,449,189 | $ 24,663,843 |
| 368 | Compressor Station Equipment | $ 27,708 | $ 48,353 | 61% | $ 29,495 | $ 32,576 | $ 19,871 |
| 369 | Measuring and Regulating Equipment | $ 4,009,488 | $ 5,937,120 | 65% | $ 3,859,128 | $ 4,802,037 | $ 3,121,324 |
| 370 | Other Equipment | $ 6,426 | $ 15,219 | 0% | $ - | $ 9,018 | $ - |
| | | $ 29,481,261 | $ 54,632,939 | | $ 43,999,824 | $ 39,636,558 | $ 32,061,321 |
| | **Distribution Plant** | | | | | | |
| 374 | Land and Land Rights | $ 119,160 | $ 770,992 | 100% | $ 770,992 | $ 770,992 | $ 770,992 |
| 375 | Structures and Improvements | $ 115,596 | $ 950,693 | 36% | $ 342,250 | $ 318,361 | $ 114,610 |
| 376 | Mains | $ 71,873,241 | $ 198,018,153 | 48% | $ 94,900,200 | $ 123,546,394 | $ 59,209,609 |
| 378 | Measuring and Regulating Sta. Equip. - General | $ 2,605,566 | $ 4,387,725 | 76% | $ 3,334,671 | $ 3,317,109 | $ 2,521,003 |
| 380 | Services | $ 48,793,740 | $ 84,983,281 | 54% | $ 46,018,447 | $ 60,385,954 | $ 32,698,994 |
| 381 | Meters | $ 12,310,204 | $ 13,218,251 | 63% | $ 8,327,498 | $ 9,812,126 | $ 6,181,639 |
| 382 | Meter Installations | $ 449,304 | $ 1,035,503 | 72% | $ 745,562 | $ 747,758 | $ 538,386 |
| 383 | House Regulators | $ 416,792 | $ 520,814 | 74% | $ 385,402 | $ 378,415 | $ 280,027 |
| 384 | House Regulator Installations | $ 121,259 | $ 273,403 | 75% | $ 205,052 | $ 197,241 | $ 147,930 |
| 385 | Industrial Measuring & Regulating Station Equipment | $ 14,986 | $ 20,338 | 94% | $ 19,118 | $ 18,727 | $ 17,603 |
| 387 | Other Equipment | $ 30,285 | $ 46,688 | 76% | $ 35,483 | $ 39,565 | $ 30,070 |
| | | $ 136,850,133 | $ 304,225,841 | | $ 155,084,675 | $ 199,532,641 | $ 102,510,864 |
| | **General Plant** | | | | | | |
| 390 | Structures and Improvements | $ 30,885 | $ 43,519 | 81% | $ 35,251 | $ 34,991 | $ 28,342 |
| 391.1 | Electronic Equipment | $ 364,906 | $ 194,822 | 0% | $ - | $ 165,810 | $ - |
| 391.2 | Furniture & Fixtures | $ 39,238 | $ 50,422 | 62% | $ 31,477 | $ 41,215 | $ 25,729 |
| 392 | Transportation Equipment | $ 3,795,852 | $ 4,275,000 | 31% | $ 1,325,250 | $ 3,881,108 | $ 1,203,144 |
| 393 | Stores Equipment | $ 3,679 | $ 4,446 | 57% | $ 2,534 | $ 3,500 | $ 1,995 |
| 394 | Tools, Shop and Garage Equipment | $ 866,684 | $ 1,165,135 | 10% | $ 116,514 | $ 872,980 | $ 87,298 |
| 395 | Laboratory Equipment | $ 344,980 | $ 489,527 | 43% | $ 210,496 | $ 369,846 | $ 159,034 |
| 396 | Power Operated Equipment | $ 1,618,625 | $ 2,105,014 | 60% | $ 1,263,009 | $ 1,723,868 | $ 1,034,321 |
| 397 | Communication Equipment | $ 140,098 | $ 121,586 | 83% | $ 100,916 | $ 105,686 | $ 87,720 |
| 398 | Miscellaneous Equipment | $ 137,183 | $ 165,016 | 43% | $ 70,957 | $ 133,712 | $ 57,496 |
| | | $ 7,342,130 | $ 8,614,489 | | $ 3,156,404 | $ 7,332,716 | $ 2,685,079 |
| | Total Gas Plant | $ 186,267,927 | $ 411,456,619 | | $ 234,411,750 | $ 280,410,318 | $ 166,074,235 |
| | **Common Plant - Gas** | | | | | | |
| 303 | Miscellaneous Intangible Plant | $ 9,264 | $ 9,653 | 100% | $ 9,653 | $ 9,080 | $ 9,080 |
| 389 | Land & Rights | $ 429,658 | $ 2,104,840 | 100% | $ 2,104,840 | $ 2,104,840 | $ 2,104,840 |
| 390 | Structures & Improvements | $ 4,702,199 | $ 7,912,783 | 73% | $ 5,776,332 | $ 5,685,374 | $ 4,150,323 |
| 391 | Office Furniture & Equipment | $ 777,565 | $ 959,160 | 17% | $ 163,057 | $ 816,458 | $ 138,798 |
| 392 | Transportation Equipment | $ 138,010 | $ 158,042 | 28% | $ 44,252 | $ 133,792 | $ 37,462 |
| 392 | Stores Equipment | $ 80,878 | $ 112,501 | 38% | $ 42,750 | $ 78,802 | $ 29,945 |
| 394 | Tools, Shop & Garage Equipment | $ 59,073 | $ 75,066 | 16% | $ 12,011 | $ 56,625 | $ 9,060 |
| 396 | Power Operated Equipment | $ 8,938 | $ 12,048 | 55% | $ 6,627 | $ 9,476 | $ 5,212 |
| 397 | Communication Equipment | $ 510,831 | $ 452,060 | 60% | $ 271,236 | $ 331,987 | $ 199,192 |
| 398 | Miscellaneous Equipment | $ 42,265 | $ 62,966 | 8% | $ 5,037 | $ 42,081 | $ 3,366 |
| | | $ 6,758,680 | $ 11,859,118 | | $ 8,435,794 | $ 9,268,516 | $ 6,687,279 |
| | Total Plant | $ 193,026,607 | $ 423,315,737 | | $ 242,847,544 | $ 289,678,834 | $ 172,761,514 |

| Line No. | (a) Description | (b) Account No | (c) Installation Date | (d) Original Cost | (e) Adjustment Factor | (f) Reproduction Cost New | (g) Technology Adjustment Factor | (h) Technologically Adjusted RCN |
|---|---|---|---|---|---|---|---|---|
| 1 | Organization | 301 | 1995 | $10,054 | 1.000 | $10,054 | 1.000 | $ 10,054 |
| 2 | | | | **$10,054** | | **$10,054** | | **$ 10,054** |
| 3 | | | | | | | | |
| 4 | Franchises and Consents | 302 | 1982 | $454 | 1.000 | $454 | 1.000 | $ 454 |
| 5 | | | | **$454** | | **$454** | | **$ 454** |
| 6 | | | | | | | | |
| 7 | **Natural Gas Production and Gathering Plant** | | | | | | | |
| 8 | | | | | | | | |
| 9 | *Producing gas wells construction* | 330 | 1982 | $29,161 | 2.097 | $61,153 | 0.590 | $ 36,051 |
| 10 | | | | **$29,161** | | **$61,153** | | **$ 36,051** |
| 11 | | | | | | | | |
| 12 | *Producing gas wells equipment* | 331 | 1982 | $15,141 | 2.097 | $31,752 | 0.590 | $ 18,718 |
| 13 | *Producting field lines* | 332 | 1982 | $9,942 | 2.097 | $20,849 | 0.590 | $ 12,291 |
| 14 | | | | **$25,083** | | **$52,601** | | **$ 31,009** |
| 15 | | | | | | | | |
| 16 | **Underground Storage Plant** | | | | | | | |
| 17 | Land | 350.1 | 1953 | $8,212 | 16.310 | $133,938 | 1.000 | $ 133,938 |
| 18 | | 350.1 | 1954 | $24,760 | 16.486 | $408,203 | 1.000 | $ 408,203 |
| 19 | | 350.1 | 1955 | $21,822 | 15.404 | $336,149 | 1.000 | $ 336,149 |
| 20 | | 350.1 | 1957 | $32,648 | 13.261 | $432,937 | 1.000 | $ 432,937 |
| 21 | | 350.1 | 1958 | $15 | 12.603 | $189 | 1.000 | $ 189 |
| 22 | | 350.1 | 1959 | $561 | 11.868 | $6,659 | 1.000 | $ 6,659 |
| 23 | | 350.1 | 1960 | $3,342 | 11.553 | $38,608 | 1.000 | $ 38,608 |
| 24 | | 350.1 | 1961 | $105 | 11.914 | $1,251 | 1.000 | $ 1,251 |
| 25 | | 350.1 | 1962 | $333 | 11.553 | $3,848 | 1.000 | $ 3,848 |
| 26 | | 350.1 | 1966 | $165,273 | 8.379 | $1,384,842 | 1.000 | $ 1,384,842 |
| 27 | | 350.1 | 1967 | $15,372 | 7.761 | $119,296 | 1.000 | $ 119,296 |
| 28 | | 350.1 | 1968 | $97,634 | 7.349 | $717,551 | 1.000 | $ 717,551 |
| 29 | | 350.1 | 1969 | $195,736 | 7.314 | $1,431,643 | 1.000 | $ 1,431,643 |
| 30 | | 350.1 | 1970 | $322 | 7.512 | $2,420 | 1.000 | $ 2,420 |
| 31 | | 350.1 | 1972 | $150,704 | 7.011 | $1,056,664 | 1.000 | $ 1,056,664 |
| 32 | | 350.1 | 1973 | $486 | 6.174 | $3,001 | 1.000 | $ 3,001 |
| 33 | | 350.1 | 1985 | $5,870 | 2.269 | $13,322 | 1.000 | $ 13,322 |
| 34 | | 350.1 | 1986 | $770,455 | 2.614 | $2,013,615 | 1.000 | $ 2,013,615 |
| 35 | | 350.1 | 1987 | $2,015,122 | 2.875 | $5,792,762 | 1.000 | $ 5,792,762 |
| 36 | | 350.1 | 1988 | $419,874 | 2.634 | $1,105,885 | 1.000 | $ 1,105,885 |
| 37 | | 350.1 | 1989 | $232,004 | 2.442 | $566,542 | 1.000 | $ 566,542 |
| 38 | | 350.1 | 1990 | $28,471 | 2.432 | $69,247 | 1.000 | $ 69,247 |
| 39 | | 350.1 | 1991 | $699 | 2.363 | $1,652 | 1.000 | $ 1,652 |
| 40 | | 350.1 | 1993 | $225,103 | 2.186 | $492,161 | 1.000 | $ 492,161 |
| 41 | | 350.1 | 1994 | $1,508,093 | 2.033 | $3,066,456 | 1.000 | $ 3,066,456 |
| 42 | | 350.1 | 1995 | $3,203 | 1.883 | $6,030 | 1.000 | $ 6,030 |
| 43 | | 350.1 | 1996 | $582,972 | 1.753 | $1,021,877 | 1.000 | $ 1,021,877 |
| 44 | | 350.1 | 1997 | $281,014 | 1.631 | $458,339 | 1.000 | $ 458,339 |
| 45 | | 350.1 | 2002 | $181,540 | 1.240 | $225,080 | 1.000 | $ 225,080 |
| 46 | | | | **$6,971,745** | | **$20,910,167** | | **$ 20,910,167** |
| 47 | | | | | | | | |
| 48 | Storage Leaseholds and Rights | 352.1 | 1953 | $3,721 | 16.310 | $60,694 | 1.000 | $ 60,694 |
| 49 | | 352.1 | 1954 | $9,800 | 16.486 | $161,572 | 1.000 | $ 161,572 |
| 50 | | 352.1 | 1955 | $17,548 | 15.404 | $270,314 | 1.000 | $ 270,314 |
| 51 | | 352.1 | 1956 | $643 | 14.524 | $9,342 | 1.000 | $ 9,342 |
| 52 | | 352.1 | 1957 | $86 | 13.261 | $1,146 | 1.000 | $ 1,146 |
| 53 | | 352.1 | 1959 | $80 | 11.868 | $951 | 1.000 | $ 951 |
| 54 | | 352.1 | 1960 | $2 | 11.553 | $27 | 1.000 | $ 27 |
| 55 | | 352.1 | 1961 | $148,305 | 11.914 | $1,766,920 | 1.000 | $ 1,766,920 |
| 56 | | 352.1 | 1966 | $91,762 | 8.379 | $768,884 | 1.000 | $ 768,884 |
| 57 | | 352.1 | 1967 | $13,678 | 7.761 | $106,151 | 1.000 | $ 106,151 |
| 58 | | 352.1 | 1970 | $6,748 | 7.512 | $50,695 | 1.000 | $ 50,695 |
| 59 | | 352.1 | 1988 | $7,395 | 2.634 | $19,478 | 1.000 | $ 19,478 |
| 60 | | 352.1 | 1997 | $290,412 | 1.631 | $473,667 | 1.000 | $ 473,667 |
| 61 | | 352.1 | 1998 | $229,672 | 1.481 | $340,049 | 1.000 | $ 340,049 |
| 62 | | 352.1 | 2000 | $267,226 | 1.350 | $360,636 | 1.000 | $ 360,636 |
| 63 | | | | **$1,087,081** | | **$4,390,526** | | **$ 4,390,526** |
| 64 | | | | | | | | |
| 65 | Nonrecoverable Natural Gas | 350.5 | 1982 | $483,848 | | $53,057,194 | 1.000 | $ 483,848 |
| 66 | | | | **$483,848** | | **$53,057,194** | | **$ 483,848** |
| 67 | Compressor Station Equipment | | | | | | | |
| 68 | | 351.2 | 1953 | $12,993 | 11.690 | $151,900 | 0.309 | $ 46,970 |
| 69 | | 351.2 | 1954 | $1,833 | 11.159 | $20,452 | 0.316 | $ 6,466 |
| 70 | | 351.2 | 1955 | $10,029 | 10.911 | $109,427 | 0.323 | $ 35,376 |
| 71 | | 351.2 | 1956 | $475 | 9.820 | $4,661 | 0.331 | $ 1,541 |
| 72 | | 351.2 | 1957 | $287 | 9.093 | $2,606 | 0.338 | $ 881 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 73 | | 351.2 | 1960 | $597 | 8.049 | $4,806 | 0.361 | $ 1,737 |
| 74 | | 351.2 | 1961 | $2,421 | 8.183 | $19,812 | 0.369 | $ 7,320 |
| 75 | | 351.2 | 1966 | $959 | 7.014 | $6,729 | 0.413 | $ 2,779 |
| 76 | | 351.2 | 1967 | $29,082 | 6.726 | $195,605 | 0.422 | $ 82,590 |
| 77 | | 351.2 | 1968 | $667 | 6.377 | $4,256 | 0.432 | $ 1,837 |
| 78 | | 351.2 | 1969 | $980 | 6.062 | $5,939 | 0.441 | $ 2,622 |
| 79 | | 3512 | 1970 | $592 | 5.709 | $3,379 | 0.451 | $ 1,525 |
| 80 | | 351.2 | 1971 | $1,029 | 5.456 | $5,612 | 0.462 | $ 2,590 |
| 81 | | 351.2 | 1992 | $6,743 | 1.413 | $9,528 | 0.736 | $ 7,016 |
| 82 | | 351.2 | 1993 | $8,289 | 1.376 | $11,409 | 0.753 | $ 8,591 |
| 83 | | 351.2 | 1995 | $3,671 | 1.309 | $4,807 | 0.787 | $ 3,785 |
| 84 | | 351.2 | 2002 | $26,485 | 1.165 | $30,853 | 0.920 | $ 28,383 |
| 85 | | | | **$107,133** | | **$591,782** | | **$ 242,008** |
| 86 | | | | | | | | |
| 87 | Underground Measuring & Regulating Stati | 351.3 | 1953 | $1,353 | 11.867 | $16,053 | 0.309 | $ 4,964 |
| 88 | | 351.3 | 1954 | $191 | 11.362 | $2,168 | 0.316 | $ 685 |
| 89 | | 351.3 | 1955 | $1,044 | 11.125 | $11,616 | 0.323 | $ 3,755 |
| 90 | | 351.3 | 1956 | $49 | 10.680 | $528 | 0.331 | $ 174 |
| 91 | | 351.3 | 1957 | $30 | 10.075 | $301 | 0.338 | $ 102 |
| 92 | | 351.3 | 1960 | $62 | 9.207 | $572 | 0.361 | $ 207 |
| 93 | | 351.3 | 1961 | $252 | 9.051 | $2,281 | 0.369 | $ 843 |
| 94 | | 351.3 | 1966 | $100 | 8.344 | $833 | 0.413 | $ 344 |
| 95 | | 351.3 | 1967 | $3,028 | 8.091 | $24,497 | 0.422 | $ 10,343 |
| 96 | | 351.3 | 1968 | $69 | 7.739 | $538 | 0.432 | $ 232 |
| 97 | | 351.3 | 1969 | $102 | 7.216 | $736 | 0.441 | $ 325 |
| 98 | | 351.3 | 1970 | $62 | 6.593 | $406 | 0.451 | $ 183 |
| 99 | | 351.3 | 1971 | $107 | 6.000 | $643 | 0.462 | $ 297 |
| 100 | | 351.3 | 1992 | $702 | 1.679 | $1,179 | 0.736 | $ 868 |
| 101 | | 351.3 | 1993 | $939 | 1.641 | $1,540 | 0.753 | $ 1,160 |
| 102 | | 351.3 | 2002 | $79,496 | 1.304 | $103,665 | 0.920 | $ 95,366 |
| 103 | | | | **$87,586** | | **$167,556** | | **$ 119,849** |
| 104 | | | | | | | | |
| 105 | Other Structures | 351.4 | 1984 | $63,944 | 1.888 | $120,756 | 0.616 | $ 74,427 |
| 106 | | 351.4 | 1992 | $21,479 | 1.413 | $30,349 | 0.736 | $ 22,350 |
| 107 | | 351.4 | 1993 | $23,476 | 1.376 | $32,310 | 0.753 | $ 24,330 |
| 108 | | 351.4 | 1995 | $8,744 | 1.309 | $11,449 | 0.787 | $ 9,013 |
| 109 | | 351.4 | 2002 | $7,815 | 1.165 | $9,104 | 0.920 | $ 8,375 |
| 110 | | | | **$125,458** | | **$203,967** | | **$ 138,494** |
| 111 | | | | | | | | |
| 112 | Wells | | | | | | | |
| 113 | | 352 | 1953 | $73,411 | 10.585 | $777,082 | 0.309 | $ 240,285 |
| 114 | | 352 | 1954 | $90,053 | 10.093 | $908,907 | 0.316 | $ 287,371 |
| 115 | | 352 | 1955 | $114,408 | 9.864 | $1,128,479 | 0.323 | $ 364,821 |
| 116 | | 352 | 1956 | $31,545 | 9.234 | $291,288 | 0.331 | $ 96,288 |
| 117 | | 352 | 1957 | $102,214 | 8.680 | $887,218 | 0.338 | $ 299,877 |
| 118 | | 352 | 1958 | $42,513 | 8.346 | $354,820 | 0.346 | $ 122,627 |
| 119 | | 352 | 1959 | $257 | 8.037 | $2,066 | 0.353 | $ 730 |
| 120 | | 352 | 1963 | $41,095 | 7.356 | $302,292 | 0.386 | $ 116,767 |
| 121 | | 352 | 1964 | $5,860 | 7.000 | $41,020 | 0.395 | $ 16,201 |
| 122 | | 352 | 1966 | $264,508 | 6.781 | $1,793,695 | 0.413 | $ 740,682 |
| 123 | | 352 | 1967 | $31,846 | 6.677 | $212,633 | 0.422 | $ 89,780 |
| 124 | | 352 | 1968 | $99,176 | 6.382 | $632,976 | 0.432 | $ 273,273 |
| 125 | | 352 | 1969 | $20,775 | 5.865 | $121,843 | 0.441 | $ 53,786 |
| 126 | | 352 | 1970 | $92,544 | 5.425 | $502,051 | 0.451 | $ 226,613 |
| 127 | | 352 | 1971 | $16,925 | 4.876 | $82,533 | 0.462 | $ 38,092 |
| 128 | | 352 | 1988 | $175,549 | 1.612 | $282,965 | 0.674 | $ 190,638 |
| 129 | | 352 | 1991 | $157,519 | 1.692 | $266,523 | 0.720 | $ 191,956 |
| 130 | | 352 | 1992 | $159,002 | 1.697 | $269,822 | 0.736 | $ 198,704 |
| 131 | | 352 | 2001 | $20,702 | 1.388 | $28,728 | 0.900 | $ 25,847 |
| 132 | | 352 | 2002 | $35,348 | 1.357 | $47,978 | 0.920 | $ 44,137 |
| 133 | | | | **$1,575,250** | | **$8,934,918** | | **$ 3,618,474** |
| 134 | | | | | | | | |
| 135 | Lines | | | | | | | |
| 136 | | 353 | 1953 | $32,509 | 10.585 | $344,121 | 0.309 | $ 106,407 |
| 137 | | 353 | 1954 | $25,048 | 10.093 | $252,811 | 0.316 | $ 79,932 |
| 138 | | 353 | 1955 | $10,515 | 9.864 | $103,713 | 0.323 | $ 33,529 |
| 139 | | 353 | 1956 | $16,384 | 9.234 | $151,291 | 0.331 | $ 50,011 |
| 140 | | 353 | 1957 | $16,318 | 8.680 | $141,638 | 0.338 | $ 47,873 |
| 141 | | 353 | 1958 | $37,950 | 8.346 | $316,740 | 0.346 | $ 109,466 |
| 142 | | 353 | 1959 | $2,095 | 8.037 | $16,836 | 0.353 | $ 5,949 |
| 143 | | 353 | 1963 | $6,712 | 7.356 | $49,375 | 0.386 | $ 19,072 |
| 144 | | 353 | 1964 | $88 | 7.000 | $616 | 0.395 | $ 243 |
| 145 | | 353 | 1966 | $128,423 | 6.781 | $870,869 | 0.413 | $ 359,613 |
| 146 | | 353 | 1967 | $15 | 6.677 | $99 | 0.422 | $ 42 |
| 147 | | 353 | 1968 | $20,804 | 6.382 | $132,776 | 0.432 | $ 57,323 |
| 148 | | 353 | 1969 | $2,977 | 5.865 | $17,459 | 0.441 | $ 7,707 |
| 149 | | 353 | 1970 | $17,032 | 5.425 | $92,397 | 0.451 | $ 41,706 |
| 150 | | 353 | 1971 | $862 | 4.876 | $4,204 | 0.462 | $ 1,940 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 151 | | 353 | 1984 | $5,352 | 1.816 | $9,719 | 0.616 | $ | 5,990 |
| 152 | | 353 | 1991 | $39,449 | 1.692 | $66,748 | 0.720 | $ | 48,073 |
| 153 | | 353 | 1992 | $32,164 | 1.697 | $54,581 | 0.736 | $ | 40,195 |
| 154 | | 353 | 1993 | $22,573 | 1.679 | $37,898 | 0.753 | $ | 28,537 |
| 155 | | 353 | 1996 | $138,835 | 1.504 | $208,854 | 0.805 | $ | 168,122 |
| 156 | | 353 | 2002 | $202,663 | 1.357 | $275,077 | 0.920 | $ | 253,056 |
| 157 | | 353 | 2004 | $40,117 | 1.546 | $62,015 | 0.962 | $ | 59,647 |
| 158 | | 353 | 2006 | $13,360 | 1.000 | $13,360 | 0.997 | $ | 13,323 |
| 159 | | | | **$812,245** | | **$3,223,199** | | **$** | **1,637,759** |
| 160 | | | | | | | | | |
| 161 | Underground Compressor Station Equipme | 354 | 1953 | $91,812 | 11.690 | $1,073,326 | 0.309 | $ | 331,888 |
| 162 | | 354 | 1955 | $5,189 | 10.911 | $56,618 | 0.323 | $ | 18,304 |
| 163 | | 354 | 1958 | $389 | 8.466 | $3,293 | 0.346 | $ | 1,138 |
| 164 | | 354 | 1961 | $119,915 | 8.183 | $981,304 | 0.369 | $ | 362,552 |
| 165 | | 354 | 1962 | $51 | 8.183 | $417 | 0.378 | $ | 158 |
| 166 | | 354 | 1966 | $8,164 | 7.014 | $57,265 | 0.413 | $ | 23,647 |
| 167 | | 354 | 1967 | $99,059 | 6.726 | $666,274 | 0.422 | $ | 281,319 |
| 168 | | 354 | 1968 | $1,862 | 6.377 | $11,873 | 0.432 | $ | 5,126 |
| 169 | | 354 | 1969 | $4,552 | 6.062 | $27,593 | 0.441 | $ | 12,181 |
| 170 | | 354 | 1974 | $1,398 | 4.270 | $5,969 | 0.493 | $ | 2,945 |
| 171 | | 354 | 1980 | $5,577 | 2.316 | $12,917 | 0.564 | $ | 7,283 |
| 172 | | 354 | 2005 | $878 | 1.000 | $878 | 0.983 | $ | 863 |
| 173 | | | | **$338,846** | | **$2,897,726** | | **$** | **1,047,403** |
| 174 | | | | | | | | | |
| 175 | Measuring and Regulating Equipment | 355 | 1966 | $22,663 | 8.344 | $189,098 | 0.413 | $ | 78,086 |
| 176 | | 355 | 1967 | $15,185 | 8.091 | $122,857 | 0.422 | $ | 51,874 |
| 177 | | 355 | 1969 | $12,810 | 7.216 | $92,439 | 0.441 | $ | 40,806 |
| 178 | | 355 | 1970 | $606 | 6.593 | $3,993 | 0.451 | $ | 1,802 |
| 179 | | 355 | 1971 | $4,248 | 6.000 | $25,486 | 0.462 | $ | 11,763 |
| 180 | | 355 | 1972 | $140 | 5.563 | $778 | 0.472 | $ | 367 |
| 181 | | 355 | 1981 | $2,255 | 2.395 | $5,399 | 0.577 | $ | 3,113 |
| 182 | | 355 | 1987 | $109,150 | 2.054 | $224,177 | 0.659 | $ | 147,708 |
| 183 | | 355 | 1989 | $127,340 | 1.815 | $231,095 | 0.689 | $ | 159,195 |
| 184 | | 355 | 1990 | $285 | 1.810 | $516 | 0.704 | $ | 363 |
| 185 | | 355 | 1993 | $43,553 | 1.641 | $71,451 | 0.753 | $ | 53,802 |
| 186 | | 355 | 2002 | $254,589 | 1.304 | $331,992 | 0.920 | $ | 305,414 |
| 187 | | 355 | 2006 | $54,263 | 1.000 | $54,263 | 0.997 | $ | 54,112 |
| 188 | | | | **$647,086** | | **$1,353,544** | | **$** | **908,406** |
| 189 | | | | | | | | | |
| 190 | Purification Equipment | 356 | 1966 | $21,101 | 8.344 | $176,059 | 0.413 | $ | 72,701 |
| 191 | | 356 | 1967 | $3,880 | 8.091 | $31,393 | 0.422 | $ | 13,255 |
| 192 | | 356 | 1973 | $374 | 5.340 | $1,999 | 0.483 | $ | 965 |
| 193 | | 356 | 1975 | $8,392 | 4.045 | $33,950 | 0.504 | $ | 17,128 |
| 194 | | 356 | 1981 | $936 | 2.395 | $2,242 | 0.577 | $ | 1,292 |
| 195 | | 356 | 1987 | $3,880 | 2.054 | $7,969 | 0.659 | $ | 5,251 |
| 196 | | 356 | 1988 | $30,170 | 1.909 | $57,589 | 0.674 | $ | 38,799 |
| 197 | | 356 | 1991 | $160,845 | 1.776 | $285,590 | 0.720 | $ | 205,688 |
| 198 | | 356 | 1992 | $10,423 | 1.679 | $17,503 | 0.736 | $ | 12,890 |
| 199 | | 356 | 1993 | $53,372 | 1.641 | $87,560 | 0.753 | $ | 65,932 |
| 200 | | | | **$293,373** | | **$701,854** | | **$** | **433,900** |
| 201 | | | | | | | | | |
| 202 | **Transmission Plant** | | | | | | | | |
| 203 | Rights-of-Way | 365.1 | 1955 | $369 | 15.404 | $5,684 | 1.000 | $ | 5,684 |
| 204 | | 365.1 | 1963 | $602 | 11.011 | $6,629 | 1.000 | $ | 6,629 |
| 205 | | 365.1 | 1966 | $1,111 | 8.379 | $9,309 | 1.000 | $ | 9,309 |
| 206 | | 365.1 | 1967 | $52 | 7.761 | $404 | 1.000 | $ | 404 |
| 207 | | 365.1 | 1970 | $1,150 | 7.512 | $8,639 | 1.000 | $ | 8,639 |
| 208 | | 365.1 | 1973 | $5 | 6.174 | $31 | 1.000 | $ | 31 |
| 209 | | 365.1 | 1986 | $2,310 | 2.614 | $6,037 | 1.000 | $ | 6,037 |
| 210 | | 365.1 | 1987 | $2,550 | 2.875 | $7,330 | 1.000 | $ | 7,330 |
| 211 | | 365.1 | 1988 | $17,902 | 2.634 | $47,151 | 1.000 | $ | 47,151 |
| 212 | | 365.1 | 1992 | $16,121 | 2.302 | $37,109 | 1.000 | $ | 37,109 |
| 213 | | 365.1 | 1997 | $246,182 | 1.631 | $401,527 | 1.000 | $ | 401,527 |
| 214 | | 365.1 | 1998 | $28,140 | 1.481 | $41,664 | 1.000 | $ | 41,664 |
| 215 | | 365.1 | 2003 | $193 | 1.187 | $229 | 1.000 | $ | 229 |
| 216 | | 365.1 | 2006 | $138,962 | 1.000 | $138,962 | 1.000 | $ | 138,962 |
| 217 | | | | **$455,649** | | **$710,704** | | **$** | **710,704** |
| 218 | | | | | | | | | |
| 219 | Transmission Rights of Way | 365.2 | 1951 | $3,277 | 18.485 | $60,575 | 1.000 | $ | 60,575 |
| 220 | | 365.2 | 1953 | $10,458 | 16.310 | $170,572 | 1.000 | $ | 170,572 |
| 221 | | 365.2 | 1954 | $5,899 | 16.486 | $97,254 | 1.000 | $ | 97,254 |
| 222 | | 365.2 | 1955 | $608 | 15.404 | $9,366 | 1.000 | $ | 9,366 |
| 223 | | 365.2 | 1957 | $12,950 | 13.261 | $171,728 | 1.000 | $ | 171,728 |
| 224 | | 365.2 | 1958 | $3,729 | 12.603 | $46,998 | 1.000 | $ | 46,998 |
| 225 | | 365.2 | 1959 | $12,489 | 11.868 | $148,216 | 1.000 | $ | 148,216 |
| 226 | | 365.2 | 1960 | $7,935 | 11.553 | $91,673 | 1.000 | $ | 91,673 |
| 227 | | 365.2 | 1961 | $326 | 11.914 | $3,884 | 1.000 | $ | 3,884 |
| 228 | | 365.2 | 1962 | $2,319 | 11.553 | $26,791 | 1.000 | $ | 26,791 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 229 | | 365.2 | 1963 | $14,385 | 11.011 | $158,391 | 1.000 | $ | 158,391 |
| 230 | | 365.2 | 1964 | $910 | 10.235 | $9,314 | 1.000 | $ | 9,314 |
| 231 | | 365.2 | 1965 | $2,055 | 9.591 | $19,710 | 1.000 | $ | 19,710 |
| 232 | | 365.2 | 1966 | $37,482 | 8.379 | $314,066 | 1.000 | $ | 314,066 |
| 233 | | 365.2 | 1967 | $5,503 | 7.761 | $42,708 | 1.000 | $ | 42,708 |
| 234 | | 365.2 | 1968 | $19,859 | 7.349 | $145,952 | 1.000 | $ | 145,952 |
| 235 | | 365.2 | 1969 | $14,357 | 7.314 | $105,009 | 1.000 | $ | 105,009 |
| 236 | | 365.2 | 1970 | $17,291 | 7.512 | $129,895 | 1.000 | $ | 129,895 |
| 237 | | 365.2 | 1971 | $17,387 | 7.227 | $125,664 | 1.000 | $ | 125,664 |
| 238 | | 365.2 | 1972 | $2,919 | 7.011 | $20,467 | 1.000 | $ | 20,467 |
| 239 | | 365.2 | 1982 | $76,504 | 1.691 | $129,344 | 1.000 | $ | 129,344 |
| 240 | | 365.2 | 1986 | $100,338 | 2.614 | $262,237 | 1.000 | $ | 262,237 |
| 241 | | 365.2 | 1987 | $432 | 2.875 | $1,242 | 1.000 | $ | 1,242 |
| 242 | | 365.2 | 1988 | $25,677 | 2.634 | $67,629 | 1.000 | $ | 67,629 |
| 243 | | 365.2 | 1990 | $3,760 | 2.432 | $9,145 | 1.000 | $ | 9,145 |
| 244 | | 365.2 | 1991 | $11,776 | 2.363 | $27,821 | 1.000 | $ | 27,821 |
| 245 | | 365.2 | 1992 | $21,383 | 2.302 | $49,221 | 1.000 | $ | 49,221 |
| 246 | | 365.2 | 1994 | $115,512 | 2.033 | $234,874 | 1.000 | $ | 234,874 |
| 247 | | 365.2 | 1995 | $97,056 | 1.883 | $182,729 | 1.000 | $ | 182,729 |
| 248 | | 365.2 | 2002 | $290,815 | 1.240 | $360,563 | 1.000 | $ | 360,563 |
| 249 | | 365.2 | 2006 | $118,476 | 1.000 | $118,476 | 1.000 | $ | 118,476 |
| 250 | | | | **$1,053,867** | | **$3,341,515** | | **$** | **3,341,515** |
| 251 | | | | | | | | | |
| 252 | Measuring and Regulating Station Structur | 366.2 | 1951 | $537 | 11.865 | $6,371 | 0.296 | $ | 1,884 |
| 253 | | 366.2 | 1953 | $3,223 | 10.975 | $35,370 | 0.309 | $ | 10,937 |
| 254 | | 366.2 | 1954 | $3,498 | 10.452 | $36,560 | 0.316 | $ | 11,559 |
| 255 | | 366.2 | 1956 | $464 | 9.340 | $4,334 | 0.331 | $ | 1,433 |
| 256 | | 366.2 | 1960 | $3,469 | 8.130 | $28,200 | 0.361 | $ | 10,190 |
| 257 | | 366.2 | 1965 | $2,575 | 7.569 | $19,489 | 0.404 | $ | 7,871 |
| 258 | | 366.2 | 1966 | $567 | 7.317 | $4,148 | 0.413 | $ | 1,713 |
| 259 | | 366.2 | 1967 | $1,474 | 7.081 | $10,436 | 0.422 | $ | 4,406 |
| 260 | | 366.2 | 1971 | $888 | 5.105 | $4,533 | 0.462 | $ | 2,092 |
| 261 | | 366.2 | 1983 | $1,487 | 2.081 | $3,094 | 0.603 | $ | 1,865 |
| 262 | | 366.2 | 1988 | $18,928 | 1.749 | $33,105 | 0.674 | $ | 22,303 |
| 263 | | 366.2 | 1992 | $24,605 | 1.671 | $41,110 | 0.736 | $ | 30,274 |
| 264 | | 366.2 | 1994 | $117,605 | 1.503 | $176,810 | 0.770 | $ | 136,133 |
| 265 | | 366.2 | 1995 | $29,914 | 1.443 | $43,163 | 0.787 | $ | 33,980 |
| 266 | | 366.2 | 2004 | $14,465 | 1.069 | $15,469 | 0.962 | $ | 14,878 |
| 267 | | | | **$223,698** | | **$462,193** | | **$** | **291,519** |
| 268 | | | | | | | | | |
| 269 | Mains | 367 | 1953 | $23,780 | 10.585 | $251,722 | 0.309 | $ | 77,836 |
| 270 | | 367 | 1954 | $119,442 | 10.093 | $1,205,530 | 0.316 | $ | 381,155 |
| 271 | | 367 | 1955 | $9,828 | 9.864 | $96,944 | 0.323 | $ | 31,341 |
| 272 | | 367 | 1956 | $3,808 | 9.234 | $35,164 | 0.331 | $ | 11,624 |
| 273 | | 367 | 1957 | $63,136 | 8.680 | $548,023 | 0.338 | $ | 185,230 |
| 274 | | 367 | 1958 | $14,847 | 8.346 | $123,917 | 0.346 | $ | 42,826 |
| 275 | | 367 | 1959 | $131,337 | 8.037 | $1,055,564 | 0.353 | $ | 373,013 |
| 276 | | 367 | 1960 | $7,038 | 7.891 | $55,533 | 0.361 | $ | 20,066 |
| 277 | | 367 | 1961 | $882 | 7.614 | $6,716 | 0.369 | $ | 2,481 |
| 278 | | 367 | 1962 | $59,060 | 7.483 | $441,929 | 0.378 | $ | 166,948 |
| 279 | | 367 | 1963 | $52,475 | 7.356 | $385,999 | 0.386 | $ | 149,101 |
| 280 | | 367 | 1964 | $160 | 7.000 | $1,122 | 0.395 | $ | 443 |
| 281 | | 367 | 1965 | $51,115 | 6.889 | $352,128 | 0.404 | $ | 142,207 |
| 282 | | 367 | 1966 | $495,508 | 6.781 | $3,360,165 | 0.413 | $ | 1,387,535 |
| 283 | | 367 | 1967 | $1,005 | 6.677 | $6,713 | 0.422 | $ | 2,834 |
| 284 | | 367 | 1968 | $3,932 | 6.382 | $25,098 | 0.432 | $ | 10,836 |
| 285 | | 367 | 1969 | $207,282 | 5.865 | $1,215,682 | 0.441 | $ | 536,653 |
| 286 | | 367 | 1970 | $2,968 | 5.425 | $16,100 | 0.451 | $ | 7,267 |
| 287 | | 367 | 1971 | $496,751 | 4.876 | $2,422,360 | 0.462 | $ | 1,117,991 |
| 288 | | 367 | 1972 | $78,352 | 4.521 | $354,218 | 0.472 | $ | 167,160 |
| 289 | | 367 | 1973 | $8,601 | 4.340 | $37,329 | 0.483 | $ | 18,012 |
| 290 | | 367 | 1974 | $30,898 | 3.774 | $116,605 | 0.493 | $ | 57,532 |
| 291 | | 367 | 1975 | $4,197 | 3.313 | $13,904 | 0.504 | $ | 7,014 |
| 292 | | 367 | 1978 | $23,591 | 2.480 | $58,507 | 0.539 | $ | 31,554 |
| 293 | | 367 | 1981 | $53,791 | 1.879 | $101,062 | 0.577 | $ | 58,267 |
| 294 | | 367 | 1982 | $98,156 | 1.715 | $168,378 | 0.590 | $ | 99,261 |
| 295 | | 367 | 1983 | $179,797 | 1.816 | $326,493 | 0.603 | $ | 196,804 |
| 296 | | 367 | 1984 | $41,912 | 1.816 | $76,108 | 0.616 | $ | 46,909 |
| 297 | | 367 | 1985 | $398,878 | 1.824 | $727,366 | 0.630 | $ | 458,394 |
| 298 | | 367 | 1986 | $239,635 | 1.764 | $422,771 | 0.644 | $ | 272,430 |
| 299 | | 367 | 1987 | $1,370,091 | 1.715 | $2,350,275 | 0.659 | $ | 1,548,572 |
| 300 | | 367 | 1988 | $179,953 | 1.612 | $290,064 | 0.674 | $ | 195,420 |
| 301 | | 367 | 1989 | $1,461,268 | 1.603 | $2,342,346 | 0.689 | $ | 1,613,580 |
| 302 | | 367 | 1990 | $635,392 | 1.658 | $1,053,525 | 0.704 | $ | 742,075 |
| 303 | | 367 | 1991 | $233,086 | 1.692 | $394,383 | 0.720 | $ | 284,043 |
| 304 | | 367 | 1992 | $644,657 | 1.697 | $1,093,963 | 0.736 | $ | 805,624 |
| 305 | | 367 | 1993 | $218,570 | 1.679 | $366,961 | 0.753 | $ | 276,320 |
| 306 | | 367 | 1994 | $33,461 | 1.641 | $54,904 | 0.770 | $ | 42,273 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 307 | | 367 | 1995 | $2,411,305 | 1.597 | $3,850,989 | 0.787 | $ | 3,031,738 |
| 308 | | 367 | 1996 | $1,774,907 | 1.504 | $2,670,051 | 0.805 | $ | 2,149,325 |
| 309 | | 367 | 1997 | $4,506,257 | 1.471 | $6,629,544 | 0.823 | $ | 5,456,695 |
| 310 | | 367 | 1998 | $1,661,579 | 1.439 | $2,391,792 | 0.842 | $ | 2,012,949 |
| 311 | | 367 | 1999 | $1,025,939 | 1.426 | $1,463,459 | 0.861 | $ | 1,259,370 |
| 312 | | 367 | 2000 | $832,191 | 1.407 | $1,170,732 | 0.880 | $ | 1,030,133 |
| 313 | | 367 | 2002 | $183,801 | 1.357 | $249,475 | 0.920 | $ | 229,504 |
| 314 | | 367 | 2003 | $37,195 | 1.333 | $49,593 | 0.941 | $ | 46,650 |
| 315 | | 367 | 2004 | $169,565 | 1.546 | $262,124 | 0.962 | $ | 252,113 |
| 316 | | 367 | 2005 | $209,992 | 1.007 | $211,454 | 0.983 | $ | 207,954 |
| 317 | | 367 | 2006 | $3,213,052 | 1.000 | $3,213,052 | 0.997 | $ | 3,204,128 |
| 318 | | | | **$23,704,425** | | **$44,117,835** | | **$** | **30,449,189** |
| 319 | | | | | | | | | |
| 320 | *Compressor Station Equipment* | 368 | 1988 | $27,708 | 1.745 | $48,353 | 0.674 | $ | 32,576 |
| 321 | | | | **$27,708** | | **$48,353** | | **$** | **32,576** |
| 322 | | | | | | | | | |
| 323 | Measuring and Regulating Equipment | 369 | 1981 | $32,639 | 2.395 | $78,159 | 0.577 | $ | 45,062 |
| 324 | | 369 | 1982 | $77,099 | 2.244 | $172,988 | 0.590 | $ | 101,979 |
| 325 | | 369 | 1983 | $13,044 | 2.253 | $29,390 | 0.603 | $ | 17,716 |
| 326 | | 369 | 1984 | $55,485 | 2.198 | $121,931 | 0.616 | $ | 75,151 |
| 327 | | 369 | 1985 | $6,952 | 2.171 | $15,091 | 0.630 | $ | 9,510 |
| 328 | | 369 | 1987 | $286,889 | 2.054 | $589,226 | 0.659 | $ | 388,235 |
| 329 | | 369 | 1988 | $155,815 | 1.909 | $297,427 | 0.674 | $ | 200,381 |
| 330 | | 369 | 1989 | $14,580 | 1.815 | $26,460 | 0.689 | $ | 18,227 |
| 331 | | 369 | 1991 | $3,701 | 1.776 | $6,571 | 0.720 | $ | 4,733 |
| 332 | | 369 | 1992 | $195,501 | 1.679 | $328,294 | 0.736 | $ | 241,764 |
| 333 | | 369 | 1993 | $324,704 | 1.641 | $532,694 | 0.753 | $ | 401,117 |
| 334 | | 369 | 1994 | $5,584 | 1.572 | $8,777 | 0.770 | $ | 6,757 |
| 335 | | 369 | 1995 | $16,959 | 1.531 | $25,967 | 0.787 | $ | 20,443 |
| 336 | | 369 | 1996 | $48,726 | 1.486 | $72,428 | 0.805 | $ | 58,303 |
| 337 | | 369 | 1997 | $26,316 | 1.437 | $37,827 | 0.823 | $ | 31,135 |
| 338 | | 369 | 1998 | $796,135 | 1.404 | $1,118,044 | 0.842 | $ | 940,953 |
| 339 | | 369 | 1999 | $893,693 | 1.383 | $1,236,352 | 0.861 | $ | 1,063,935 |
| 340 | | 369 | 2000 | $69,517 | 1.333 | $92,632 | 0.880 | $ | 81,507 |
| 341 | | 369 | 2001 | $134,347 | 1.319 | $177,139 | 0.900 | $ | 159,373 |
| 342 | | 369 | 2003 | $315,946 | 1.325 | $418,648 | 0.941 | $ | 393,799 |
| 343 | | 369 | 2005 | $174,420 | 1.028 | $179,375 | 0.983 | $ | 176,406 |
| 344 | | 369 | 2005 | $361,435 | 1.028 | $371,702 | 0.983 | $ | 365,551 |
| 345 | | | | **$4,009,488** | | **$5,937,120** | | **$** | **4,802,037** |
| 346 | | | | | | | | | |
| 347 | *Other Equipment* | 371 | 1977 | $4,511 | 2.814 | $12,694 | 0.527 | $ | 6,696 |
| 348 | | 371 | 2002 | $1,915 | 1.318 | $2,525 | 0.920 | $ | 2,322 |
| 349 | | | | **$6,426** | | **$15,219** | | **$** | **9,018** |
| 350 | | | | | | | | | |
| 351 | **Distribution Plant** | | | | | | | | |
| 352 | [Land and] Land Rights | 374.2 | 1913 | $500 | 37.654 | $18,827 | 1.000 | $ | 18,827 |
| 353 | | 374.2 | 1929 | $211 | 41.781 | $8,816 | 1.000 | $ | 8,816 |
| 354 | | 374.2 | 1930 | $360 | 42.361 | $15,250 | 1.000 | $ | 15,250 |
| 355 | | 374.2 | 1935 | $484 | 56.481 | $27,337 | 1.000 | $ | 27,337 |
| 356 | | 374.2 | 1936 | $253 | 52.586 | $13,304 | 1.000 | $ | 13,304 |
| 357 | | 374.2 | 1939 | $244 | 49.194 | $12,003 | 1.000 | $ | 12,003 |
| 358 | | 374.2 | 1947 | $2,907 | 24.206 | $70,368 | 1.000 | $ | 70,368 |
| 359 | | 374.2 | 1948 | $2,342 | 22.426 | $52,523 | 1.000 | $ | 52,523 |
| 360 | | 374.2 | 1950 | $594 | 22.263 | $13,224 | 1.000 | $ | 13,224 |
| 361 | | 374.2 | 1951 | $1,691 | 18.485 | $31,258 | 1.000 | $ | 31,258 |
| 362 | | 374.2 | 1953 | $944 | 16.310 | $15,397 | 1.000 | $ | 15,397 |
| 363 | | 374.2 | 1954 | $2,626 | 16.486 | $43,294 | 1.000 | $ | 43,294 |
| 364 | | 374.2 | 1955 | $6,510 | 15.404 | $100,280 | 1.000 | $ | 100,280 |
| 365 | | 374.2 | 1956 | $426 | 14.524 | $6,187 | 1.000 | $ | 6,187 |
| 366 | | 374.2 | 1957 | $2,977 | 13.261 | $39,478 | 1.000 | $ | 39,478 |
| 367 | | 374.2 | 1959 | $6,609 | 11.868 | $78,434 | 1.000 | $ | 78,434 |
| 368 | | 374.2 | 1960 | $34 | 11.553 | $393 | 1.000 | $ | 393 |
| 369 | | 374.2 | 1963 | $1,764 | 11.011 | $19,423 | 1.000 | $ | 19,423 |
| 370 | | 374.2 | 1964 | $343 | 10.235 | $3,511 | 1.000 | $ | 3,511 |
| 371 | | 374.2 | 1966 | $1,085 | 8.379 | $9,091 | 1.000 | $ | 9,091 |
| 372 | | 374.2 | 1967 | $179 | 7.761 | $1,389 | 1.000 | $ | 1,389 |
| 373 | | 374.2 | 1968 | $2,088 | 7.349 | $15,346 | 1.000 | $ | 15,346 |
| 374 | | 374.2 | 1969 | $1,661 | 7.314 | $12,149 | 1.000 | $ | 12,149 |
| 375 | | 374.2 | 1970 | $4,431 | 7.512 | $33,287 | 1.000 | $ | 33,287 |
| 376 | | 374.2 | 1971 | $5,427 | 7.227 | $39,224 | 1.000 | $ | 39,224 |
| 377 | | 374.2 | 1987 | $1,999 | 2.875 | $5,746 | 1.000 | $ | 5,746 |
| 378 | | 374.2 | 1988 | $2,544 | 2.634 | $6,701 | 1.000 | $ | 6,701 |
| 379 | | 374.2 | 1992 | $1,037 | 2.302 | $2,387 | 1.000 | $ | 2,387 |
| 380 | | 374.2 | 1995 | $1,165 | 1.883 | $2,193 | 1.000 | $ | 2,193 |
| 381 | | 374.2 | 1998 | $17,580 | 1.481 | $26,029 | 1.000 | $ | 26,029 |
| 382 | | 374.2 | 2005 | $7,112 | 1.000 | $7,112 | 1.000 | $ | 7,112 |
| 383 | | 374.2 | 2006 | $41,033 | 1.000 | $41,033 | 1.000 | $ | 41,033 |
| 384 | | | | **$119,160** | | **$770,992** | | **$** | **770,992** |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 385 | | | | | | | | |
| 386 Structures and Improvements | 375 | 1930 | $573 | 25.824 | $14,796 | 0.185 | $ | 2,742 |
| 387 | 375 | 1936 | $2,607 | 27.438 | $71,517 | 0.212 | $ | 15,149 |
| 388 | 375 | 1939 | $725 | 25.824 | $18,711 | 0.226 | $ | 4,237 |
| 389 | 375 | 1947 | $1,303 | 15.679 | $20,426 | 0.271 | $ | 5,527 |
| 390 | 375 | 1948 | $5,303 | 14.161 | $75,097 | 0.277 | $ | 20,776 |
| 391 | 375 | 1950 | $1,753 | 12.543 | $21,991 | 0.289 | $ | 6,361 |
| 392 | 375 | 1951 | $8,421 | 11.865 | $99,911 | 0.296 | $ | 29,549 |
| 393 | 375 | 1952 | $633 | 11.553 | $7,312 | 0.302 | $ | 2,211 |
| 394 | 375 | 1953 | $11,365 | 10.975 | $124,730 | 0.309 | $ | 38,568 |
| 395 | 375 | 1954 | $9,627 | 10.452 | $100,621 | 0.316 | $ | 31,814 |
| 396 | 375 | 1955 | $6,387 | 9.977 | $63,727 | 0.323 | $ | 20,602 |
| 397 | 375 | 1956 | $5,683 | 9.340 | $53,081 | 0.331 | $ | 17,546 |
| 398 | 375 | 1957 | $7,406 | 8.780 | $65,026 | 0.338 | $ | 21,979 |
| 399 | 375 | 1958 | $121 | 8.442 | $1,020 | 0.346 | $ | 352 |
| 400 | 375 | 1959 | $2,489 | 8.283 | $20,619 | 0.353 | $ | 7,286 |
| 401 | 375 | 1960 | $87 | 8.130 | $709 | 0.361 | $ | 256 |
| 402 | 375 | 1961 | $1,090 | 8.130 | $8,864 | 0.369 | $ | 3,275 |
| 403 | 375 | 1963 | $4,739 | 7.982 | $37,824 | 0.386 | $ | 14,611 |
| 404 | 375 | 1964 | $1,186 | 7.839 | $9,294 | 0.395 | $ | 3,671 |
| 405 | 375 | 1965 | $719 | 7.569 | $5,444 | 0.404 | $ | 2,199 |
| 406 | 375 | 1966 | $632 | 7.317 | $4,624 | 0.413 | $ | 1,910 |
| 407 | 375 | 1967 | $465 | 7.081 | $3,289 | 0.422 | $ | 1,389 |
| 408 | 375 | 1968 | $792 | 6.652 | $5,271 | 0.432 | $ | 2,276 |
| 409 | 375 | 1969 | $472 | 6.183 | $2,921 | 0.441 | $ | 1,290 |
| 410 | 375 | 1970 | $7,173 | 5.701 | $40,898 | 0.451 | $ | 18,460 |
| 411 | 375 | 1971 | $2,622 | 5.105 | $13,382 | 0.462 | $ | 6,176 |
| 412 | 375 | 1972 | $4 | 4.824 | $17 | 0.472 | $ | 8 |
| 413 | 375 | 1975 | $1,169 | 3.390 | $3,962 | 0.504 | $ | 1,999 |
| 414 | 375 | 1981 | $2,299 | 2.223 | $5,110 | 0.577 | $ | 2,946 |
| 415 | 375 | 1983 | $6,646 | 2.081 | $13,828 | 0.603 | $ | 8,335 |
| 416 | 375 | 1984 | $6,271 | 1.982 | $12,428 | 0.616 | $ | 7,660 |
| 417 | 375 | 1987 | $854 | 1.827 | $1,560 | 0.659 | $ | 1,028 |
| 418 | 375 | 1988 | $6,159 | 1.749 | $10,772 | 0.674 | $ | 7,257 |
| 419 | 375 | 1990 | $5,250 | 1.661 | $8,722 | 0.704 | $ | 6,143 |
| 420 | 375 | 1995 | $594 | 1.443 | $857 | 0.787 | $ | 675 |
| 421 | 375 | 1996 | $656 | 1.395 | $915 | 0.805 | $ | 737 |
| 422 | 375 | 2004 | $1,322 | 1.069 | $1,414 | 0.962 | $ | 1,360 |
| 423 | | | **$115,596** | | **$950,693** | | **$** | **318,361** |
| 424 | | | | | | | | |
| 425 Mains | 376 | 1952 | $154,847 | 16.595 | $2,569,621 | 0.302 | $ | 777,080 |
| 426 | 376 | 1953 | $277,967 | 15.350 | $4,266,797 | 0.309 | $ | 1,319,356 |
| 427 | 376 | 1954 | $232,959 | 14.619 | $3,405,638 | 0.316 | $ | 1,076,767 |
| 428 | 376 | 1955 | $411,474 | 14.279 | $5,875,462 | 0.323 | $ | 1,899,454 |
| 429 | 376 | 1956 | $312,900 | 13.348 | $4,176,539 | 0.331 | $ | 1,380,596 |
| 430 | 376 | 1957 | $170,507 | 12.531 | $2,136,556 | 0.338 | $ | 722,150 |
| 431 | 376 | 1958 | $346,455 | 12.039 | $4,171,048 | 0.346 | $ | 1,441,524 |
| 432 | 376 | 1959 | $308,121 | 11.585 | $3,569,553 | 0.353 | $ | 1,261,403 |
| 433 | 376 | 1960 | $165,663 | 11.164 | $1,849,400 | 0.361 | $ | 668,242 |
| 434 | 376 | 1961 | $221,570 | 10.772 | $2,386,740 | 0.369 | $ | 881,803 |
| 435 | 376 | 1962 | $289,338 | 10.586 | $3,062,987 | 0.378 | $ | 1,157,111 |
| 436 | 376 | 1963 | $292,623 | 10.233 | $2,994,508 | 0.386 | $ | 1,156,695 |
| 437 | 376 | 1964 | $215,143 | 9.903 | $2,130,610 | 0.395 | $ | 841,512 |
| 438 | 376 | 1965 | $354,065 | 9.594 | $3,396,807 | 0.404 | $ | 1,371,800 |
| 439 | 376 | 1966 | $289,180 | 9.446 | $2,731,638 | 0.413 | $ | 1,127,993 |
| 440 | 376 | 1967 | $479,961 | 8.899 | $4,270,955 | 0.422 | $ | 1,803,314 |
| 441 | 376 | 1968 | $371,185 | 8.528 | $3,165,385 | 0.432 | $ | 1,366,584 |
| 442 | 376 | 1969 | $553,765 | 7.872 | $4,359,122 | 0.441 | $ | 1,924,297 |
| 443 | 376 | 1970 | $292,698 | 7.398 | $2,165,262 | 0.451 | $ | 977,343 |
| 444 | 376 | 1971 | $530,659 | 6.747 | $3,580,490 | 0.462 | $ | 1,652,503 |
| 445 | 376 | 1972 | $53,774 | 6.396 | $343,932 | 0.472 | $ | 162,306 |
| 446 | 376 | 1973 | $201,310 | 6.140 | $1,236,041 | 0.483 | $ | 596,430 |
| 447 | 376 | 1974 | $248,380 | 5.339 | $1,326,133 | 0.493 | $ | 654,300 |
| 448 | 376 | 1975 | $85,069 | 4.835 | $411,279 | 0.504 | $ | 207,486 |
| 449 | 376 | 1976 | $67,061 | 4.515 | $302,759 | 0.516 | $ | 156,176 |
| 450 | 376 | 1977 | $67,658 | 4.205 | $284,533 | 0.527 | $ | 150,077 |
| 451 | 376 | 1978 | $158,455 | 3.814 | $604,292 | 0.539 | $ | 325,904 |
| 452 | 376 | 1979 | $84,771 | 3.529 | $299,136 | 0.551 | $ | 164,959 |
| 453 | 376 | 1980 | $560,124 | 3.283 | $1,839,122 | 0.564 | $ | 1,037,004 |
| 454 | 376 | 1981 | $761,351 | 2.966 | $2,258,307 | 0.577 | $ | 1,302,014 |
| 455 | 376 | 1982 | $732,763 | 2.717 | $1,990,780 | 0.590 | $ | 1,173,599 |
| 456 | 376 | 1983 | $1,013,391 | 2.624 | $2,659,069 | 0.603 | $ | 1,602,836 |
| 457 | 376 | 1984 | $1,168,544 | 2.527 | $2,952,617 | 0.616 | $ | 1,819,827 |
| 458 | 376 | 1985 | $1,705,075 | 2.527 | $4,308,297 | 0.630 | $ | 2,715,137 |
| 459 | 376 | 1986 | $1,677,411 | 2.624 | $4,401,412 | 0.644 | $ | 2,836,230 |
| 460 | 376 | 1987 | $1,514,760 | 2.527 | $3,827,418 | 0.659 | $ | 2,521,847 |
| 461 | 376 | 1988 | $9,085,940 | 2.350 | $21,354,133 | 0.674 | $ | 14,386,597 |
| 462 | 376 | 1989 | $2,684,405 | 2.245 | $6,026,416 | 0.689 | $ | 4,151,438 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 463 | | 376 | 1990 | $2,050,078 | 2.197 | $4,503,570 | 0.704 | $ | 3,172,194 |
| 464 | | 376 | 1991 | $2,742,396 | 2.156 | $5,913,367 | 0.720 | $ | 4,258,934 |
| 465 | | 376 | 1992 | $2,377,754 | 2.112 | $5,021,293 | 0.736 | $ | 3,697,813 |
| 466 | | 376 | 1993 | $1,945,687 | 2.059 | $4,005,538 | 0.753 | $ | 3,016,155 |
| 467 | | 376 | 1994 | $2,280,247 | 1.913 | $4,361,594 | 0.770 | $ | 3,358,159 |
| 468 | | 376 | 1995 | $4,001,662 | 1.861 | $7,445,517 | 0.787 | $ | 5,861,573 |
| 469 | | 376 | 1996 | $2,538,329 | 1.842 | $4,676,771 | 0.805 | $ | 3,764,686 |
| 470 | | 376 | 1997 | $1,848,881 | 1.790 | $3,309,659 | 0.823 | $ | 2,724,139 |
| 471 | | 376 | 1998 | $1,868,414 | 1.748 | $3,266,067 | 0.842 | $ | 2,748,745 |
| 472 | | 376 | 1999 | $4,643,416 | 1.700 | $7,892,200 | 0.861 | $ | 6,791,578 |
| 473 | | 376 | 2000 | $1,932,886 | 1.620 | $3,131,377 | 0.880 | $ | 2,755,315 |
| 474 | | 376 | 2001 | $2,747,137 | 1.589 | $4,364,145 | 0.900 | $ | 3,926,435 |
| 475 | | 376 | 2002 | $2,081,097 | 1.556 | $3,239,020 | 0.920 | $ | 2,979,725 |
| 476 | | 376 | 2003 | $2,438,856 | 1.490 | $3,634,606 | 0.941 | $ | 3,418,875 |
| 477 | | 376 | 2004 | $2,742,390 | 1.782 | $4,887,743 | 0.962 | $ | 4,701,079 |
| 478 | | 376 | 2005 | $4,162,246 | 1.044 | $4,344,444 | 0.983 | $ | 4,272,545 |
| 479 | | 376 | 2006 | $1,330,445 | 1.000 | $1,330,445 | 0.997 | $ | 1,326,750 |
| 480 | | | | **$71,873,241** | | **$198,018,153** | | **$** | **123,646,394** |
| 481 | | | | | | | | | |
| 482 | Measuring and Regulating Station Equipme | 378 | 1971 | $23,889 | 5.798 | $138,505 | 0.462 | $ | 63,924 |
| 483 | | 378 | 1972 | $22,563 | 5.375 | $121,276 | 0.472 | $ | 57,232 |
| 484 | | 378 | 1973 | $3,680 | 5.160 | $18,990 | 0.483 | $ | 9,163 |
| 485 | | 378 | 1974 | $10,133 | 4.526 | $45,867 | 0.493 | $ | 22,630 |
| 486 | | 378 | 1975 | $57,531 | 4.031 | $231,922 | 0.504 | $ | 117,002 |
| 487 | | 378 | 1976 | $9,650 | 3.686 | $35,569 | 0.516 | $ | 18,348 |
| 488 | | 378 | 1977 | $2,295 | 3.463 | $7,947 | 0.527 | $ | 4,192 |
| 489 | | 378 | 1978 | $6,611 | 3.166 | $20,929 | 0.539 | $ | 11,287 |
| 490 | | 378 | 1979 | $9,549 | 2.949 | $28,155 | 0.551 | $ | 15,526 |
| 491 | | 378 | 1980 | $25,362 | 2.702 | $68,516 | 0.564 | $ | 38,634 |
| 492 | | 378 | 1981 | $12,344 | 2.423 | $29,903 | 0.577 | $ | 17,240 |
| 493 | | 378 | 1982 | $10,158 | 2.234 | $22,690 | 0.590 | $ | 13,376 |
| 494 | | 378 | 1984 | $24,980 | 2.168 | $54,159 | 0.616 | $ | 33,381 |
| 495 | | 378 | 1985 | $26,264 | 2.150 | $56,468 | 0.630 | $ | 35,587 |
| 496 | | 378 | 1986 | $48 | 2.123 | $102 | 0.644 | $ | 66 |
| 497 | | 378 | 1987 | $34,390 | 2.056 | $70,698 | 0.659 | $ | 46,582 |
| 498 | | 378 | 1988 | $159,473 | 1.918 | $305,904 | 0.674 | $ | 206,092 |
| 499 | | 378 | 1989 | $18,334 | 1.848 | $33,878 | 0.689 | $ | 23,337 |
| 500 | | 378 | 1990 | $379,203 | 1.845 | $699,441 | 0.704 | $ | 492,668 |
| 501 | | 378 | 1991 | $193,466 | 1.830 | $354,002 | 0.720 | $ | 254,960 |
| 502 | | 378 | 1993 | $53,615 | 1.706 | $91,456 | 0.753 | $ | 68,866 |
| 503 | | 378 | 1994 | $92,887 | 1.630 | $151,437 | 0.770 | $ | 116,597 |
| 504 | | 378 | 1995 | $20,039 | 1.589 | $31,840 | 0.787 | $ | 25,067 |
| 505 | | 378 | 1997 | $71,063 | 1.498 | $106,440 | 0.823 | $ | 87,609 |
| 506 | | 378 | 1998 | $166,044 | 1.466 | $243,405 | 0.842 | $ | 204,852 |
| 507 | | 378 | 1999 | $131,636 | 1.442 | $189,865 | 0.861 | $ | 163,387 |
| 508 | | 378 | 2000 | $107,779 | 1.393 | $150,105 | 0.880 | $ | 132,078 |
| 509 | | 378 | 2001 | $166,619 | 1.371 | $228,354 | 0.900 | $ | 205,451 |
| 510 | | 378 | 2003 | $133,904 | 1.335 | $178,770 | 0.941 | $ | 168,159 |
| 511 | | 378 | 2004 | $55,773 | 1.615 | $90,075 | 0.962 | $ | 86,635 |
| 512 | | 378 | 2005 | $159,492 | 1.030 | $164,267 | 0.983 | $ | 161,549 |
| 513 | | 378 | 2006 | $416,791 | 1.000 | $416,791 | 0.997 | $ | 415,633 |
| 514 | | | | **$2,605,566** | | **$4,387,725** | | **$** | **3,317,109** |
| 515 | | | | | | | | | |
| 516 | Services | 380 | 1963 | $32,924 | 7.732 | $254,575 | 0.386 | $ | 98,335 |
| 517 | | 380 | 1964 | $243,003 | 7.596 | $1,845,970 | 0.395 | $ | 729,090 |
| 518 | | 380 | 1965 | $257,379 | 7.339 | $1,888,902 | 0.404 | $ | 762,833 |
| 519 | | 380 | 1966 | $243,964 | 6.984 | $1,703,813 | 0.413 | $ | 703,566 |
| 520 | | 380 | 1967 | $306,882 | 6.766 | $2,076,248 | 0.422 | $ | 876,649 |
| 521 | | 380 | 1968 | $274,256 | 6.463 | $1,772,427 | 0.432 | $ | 765,206 |
| 522 | | 380 | 1969 | $299,586 | 5.932 | $1,776,997 | 0.441 | $ | 784,440 |
| 523 | | 380 | 1970 | $302,586 | 5.346 | $1,617,525 | 0.451 | $ | 730,109 |
| 524 | | 380 | 1971 | $251,685 | 4.865 | $1,224,489 | 0.462 | $ | 565,138 |
| 525 | | 380 | 1972 | $345,577 | 4.558 | $1,575,103 | 0.472 | $ | 743,313 |
| 526 | | 380 | 1973 | $337,735 | 4.330 | $1,462,394 | 0.483 | $ | 705,652 |
| 527 | | 380 | 1974 | $209,403 | 3.972 | $831,847 | 0.493 | $ | 410,425 |
| 528 | | 380 | 1975 | $164,083 | 3.579 | $587,173 | 0.504 | $ | 296,223 |
| 529 | | 380 | 1976 | $141,903 | 3.409 | $483,810 | 0.516 | $ | 249,569 |
| 530 | | 380 | 1977 | $195,274 | 3.207 | $626,324 | 0.527 | $ | 330,353 |
| 531 | | 380 | 1978 | $421,949 | 3.007 | $1,268,777 | 0.539 | $ | 684,271 |
| 532 | | 380 | 1979 | $318,141 | 2.776 | $883,044 | 0.551 | $ | 486,955 |
| 533 | | 380 | 1980 | $477,656 | 2.547 | $1,216,618 | 0.564 | $ | 686,000 |
| 534 | | 380 | 1981 | $613,370 | 2.341 | $1,435,618 | 0.577 | $ | 827,698 |
| 535 | | 380 | 1982 | $764,394 | 2.102 | $1,606,712 | 0.590 | $ | 947,184 |
| 536 | | 380 | 1983 | $96,679 | 2.014 | $194,707 | 0.603 | $ | 117,366 |
| 537 | | 380 | 1984 | $76,898 | 1.959 | $150,664 | 0.616 | $ | 92,861 |
| 538 | | 380 | 1985 | $50,390 | 1.916 | $96,544 | 0.630 | $ | 60,843 |
| 539 | | 380 | 1986 | $485,207 | 1.874 | $909,501 | 0.644 | $ | 586,074 |
| 540 | | 380 | 1987 | $423,389 | 1.819 | $770,283 | 0.659 | $ | 507,532 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 541 | | 380 | 1988 | $4,243,240 | 1.762 | $7,476,390 | 0.674 | $ | 5,036,955 |
| 542 | | 380 | 1989 | $368,725 | 1.703 | $627,956 | 0.689 | $ | 432,583 |
| 543 | | 380 | 1990 | $1,310,841 | 1.654 | $2,168,459 | 0.704 | $ | 1,527,404 |
| 544 | | 380 | 1991 | $1,196,317 | 1.616 | $1,932,855 | 0.720 | $ | 1,392,084 |
| 545 | | 380 | 1992 | $1,408,710 | 1.570 | $2,212,045 | 0.736 | $ | 1,629,009 |
| 546 | | 380 | 1993 | $1,695,072 | 1.530 | $2,593,520 | 0.753 | $ | 1,952,910 |
| 547 | | 380 | 1994 | $2,754,522 | 1.475 | $4,063,741 | 0.770 | $ | 3,128,831 |
| 548 | | 380 | 1995 | $2,552,177 | 1.440 | $3,674,456 | 0.787 | $ | 2,892,760 |
| 549 | | 380 | 1996 | $2,070,588 | 1.402 | $2,903,853 | 0.805 | $ | 2,337,530 |
| 550 | | 380 | 1997 | $2,267,449 | 1.368 | $3,102,071 | 0.823 | $ | 2,553,276 |
| 551 | | 380 | 1998 | $2,602,296 | 1.324 | $3,445,854 | 0.842 | $ | 2,900,054 |
| 552 | | 380 | 1999 | $2,670,152 | 1.289 | $3,440,999 | 0.861 | $ | 2,961,128 |
| 553 | | 380 | 2000 | $2,432,615 | 1.250 | $3,039,891 | 0.880 | $ | 2,674,816 |
| 554 | | 380 | 2001 | $2,603,950 | 1.205 | $3,138,512 | 0.900 | $ | 2,823,729 |
| 555 | | 380 | 2002 | $1,780,601 | 1.164 | $2,072,581 | 0.920 | $ | 1,906,664 |
| 556 | | 380 | 2003 | $2,746,362 | 1.133 | $3,110,987 | 0.941 | $ | 2,926,335 |
| 557 | | 380 | 2004 | $1,875,679 | 1.464 | $2,746,134 | 0.962 | $ | 2,641,258 |
| 558 | | 380 | 2005 | $2,677,788 | 1.035 | $2,770,567 | 0.983 | $ | 2,724,715 |
| 559 | | 380 | 2006 | $2,202,344 | 1.000 | $2,202,344 | 0.997 | $ | 2,196,227 |
| 560 | | | | **$48,793,740** | | **$84,983,281** | | **$** | **60,385,954** |
| 561 | | | | | | | | | |
| 562 | Meters | 381 | 1973 | $108,074 | 1.880 | $203,179 | 0.483 | $ | 98,040 |
| 563 | | 381 | 1974 | $99,196 | 1.694 | $168,007 | 0.493 | $ | 82,893 |
| 564 | | 381 | 1975 | $3,406 | 1.469 | $5,003 | 0.504 | $ | 2,524 |
| 565 | | 381 | 1976 | $1,470 | 1.435 | $2,110 | 0.516 | $ | 1,089 |
| 566 | | 381 | 1977 | $6,307 | 1.382 | $8,719 | 0.527 | $ | 4,599 |
| 567 | | 381 | 1978 | $164,295 | 1.353 | $222,212 | 0.539 | $ | 119,842 |
| 568 | | 381 | 1979 | $39,081 | 1.315 | $51,379 | 0.551 | $ | 28,333 |
| 569 | | 381 | 1980 | $110,458 | 1.262 | $139,370 | 0.564 | $ | 78,585 |
| 570 | | 381 | 1981 | $122,438 | 1.190 | $145,686 | 0.577 | $ | 83,994 |
| 571 | | 381 | 1982 | $327,349 | 1.190 | $389,504 | 0.590 | $ | 229,619 |
| 572 | | 381 | 1983 | $360,916 | 1.288 | $464,742 | 0.603 | $ | 280,137 |
| 573 | | 381 | 1984 | $301,843 | 1.279 | $386,030 | 0.616 | $ | 237,927 |
| 574 | | 381 | 1985 | $223,424 | 1.190 | $265,846 | 0.630 | $ | 167,539 |
| 575 | | 381 | 1986 | $947,368 | 1.133 | $1,072,923 | 0.644 | $ | 691,382 |
| 576 | | 381 | 1987 | $583,469 | 1.139 | $664,801 | 0.659 | $ | 438,031 |
| 577 | | 381 | 1988 | $668,751 | 1.104 | $738,474 | 0.674 | $ | 497,521 |
| 578 | | 381 | 1989 | $652,507 | 1.064 | $694,039 | 0.689 | $ | 478,105 |
| 579 | | 381 | 1990 | $757,227 | 1.016 | $769,506 | 0.704 | $ | 542,020 |
| 580 | | 381 | 1991 | $608,064 | 0.988 | $600,873 | 0.720 | $ | 432,761 |
| 581 | | 381 | 1992 | $676,648 | 0.982 | $664,281 | 0.736 | $ | 489,194 |
| 582 | | 381 | 1993 | $650,373 | 0.987 | $641,838 | 0.753 | $ | 483,301 |
| 583 | | 381 | 1994 | $550,360 | 0.997 | $548,900 | 0.770 | $ | 422,619 |
| 584 | | 381 | 1995 | $444,764 | 0.989 | $440,082 | 0.787 | $ | 346,460 |
| 585 | | 381 | 1996 | $306,044 | 0.980 | $300,059 | 0.805 | $ | 241,540 |
| 586 | | 381 | 1997 | $288,832 | 0.962 | $277,751 | 0.823 | $ | 228,614 |
| 587 | | 381 | 1998 | $168,968 | 0.959 | $162,071 | 0.842 | $ | 136,400 |
| 588 | | 381 | 1999 | $466,973 | 0.986 | $460,241 | 0.861 | $ | 396,057 |
| 589 | | 381 | 2000 | $531,631 | 0.932 | $495,398 | 0.880 | $ | 435,904 |
| 590 | | 381 | 2001 | $289,709 | 0.898 | $260,288 | 0.900 | $ | 234,182 |
| 591 | | 381 | 2003 | $747,222 | 0.975 | $728,808 | 0.941 | $ | 685,550 |
| 592 | | 381 | 2004 | $357,052 | 1.377 | $491,764 | 0.962 | $ | 472,983 |
| 593 | | 381 | 2005 | $564,699 | 1.015 | $573,082 | 0.983 | $ | 563,598 |
| 594 | | 381 | 2006 | $181,286 | 1.000 | $181,286 | 0.997 | $ | 180,782 |
| 595 | | | | **$12,310,204** | | **$13,218,251** | | **$** | **9,812,126** |
| 596 | | | | | | | | | |
| 597 | Meter Installations | 382 | 1989 | $216,442 | 2.435 | $526,989 | 0.689 | $ | 363,029 |
| 598 | | 382 | 1990 | $24,221 | 2.391 | $57,924 | 0.704 | $ | 40,800 |
| 599 | | 382 | 1991 | $26,724 | 2.344 | $62,628 | 0.720 | $ | 45,106 |
| 600 | | 382 | 1992 | $31,328 | 2.313 | $72,470 | 0.736 | $ | 53,369 |
| 601 | | 382 | 1993 | $48,266 | 2.259 | $109,024 | 0.753 | $ | 82,095 |
| 602 | | 382 | 1994 | $22,370 | 2.068 | $46,254 | 0.770 | $ | 35,613 |
| 603 | | 382 | 1995 | $34,311 | 2.009 | $68,930 | 0.787 | $ | 54,266 |
| 604 | | 382 | 1996 | $45,642 | 2.000 | $91,284 | 0.805 | $ | 73,481 |
| 605 | | | | **$449,304** | | **$1,035,503** | | **$** | **747,758** |
| 606 | | | | | | | | | |
| 607 | House Regulators | 383 | 1989 | $186,478 | 1.360 | $253,551 | 0.689 | $ | 174,665 |
| 608 | | 383 | 1990 | $16,287 | 1.280 | $20,847 | 0.704 | $ | 14,684 |
| 609 | | 383 | 1991 | $16,268 | 1.217 | $19,792 | 0.720 | $ | 14,255 |
| 610 | | 383 | 1992 | $31,393 | 1.170 | $36,732 | 0.736 | $ | 27,050 |
| 611 | | 383 | 1993 | $39,567 | 1.157 | $45,790 | 0.753 | $ | 34,480 |
| 612 | | 383 | 1994 | $32,723 | 1.134 | $37,120 | 0.770 | $ | 28,580 |
| 613 | | 383 | 1995 | $70,241 | 1.138 | $79,943 | 0.787 | $ | 62,936 |
| 614 | | 383 | 1996 | $23,835 | 1.134 | $27,038 | 0.805 | $ | 21,765 |
| 615 | | | | **$416,792** | | **$520,814** | | **$** | **378,415** |
| 616 | | | | | | | | | |
| 617 | *House Regulator Installations* | 384 | 1989 | $59,695 | 2.385 | $142,350 | 0.689 | $ | 98,061 |
| 618 | | 384 | 1990 | $4,778 | 2.344 | $11,199 | 0.704 | $ | 7,888 |

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|---|---|---|---|---|---|---|---|---|
| 619 | | 384 | 1991 | $5,425 | 2.294 | $12,446 | 0.720 | $ 8,964 |
| 620 | | 384 | 1992 | $8,160 | 2.256 | $18,413 | 0.736 | $ 13,560 |
| 621 | | 384 | 1993 | $12,712 | 2.207 | $28,053 | 0.753 | $ 21,123 |
| 622 | | 384 | 1994 | $15,613 | 2.030 | $31,688 | 0.770 | $ 24,398 |
| 623 | | 384 | 1995 | $8,672 | 1.973 | $17,107 | 0.787 | $ 13,468 |
| 624 | | 384 | 1996 | $6,204 | 1.958 | $12,147 | 0.805 | $ 9,778 |
| 625 | | | | **$121,259** | | **$273,403** | | **$ 197,241** |
| 626 | | | | | | | | |
| 627 | Industrial Measuring and Regulating | 385 | 1989 | $1,982 | 1.848 | $3,662 | 0.689 | $ 2,523 |
| 628 | | 385 | 2004 | $5,610 | 1.615 | $9,060 | 0.962 | $ 8,714 |
| 629 | | 385 | 2005 | $7,394 | 1.030 | $7,615 | 0.983 | $ 7,489 |
| 630 | | | | **$14,986** | | **$20,338** | | **$ 18,727** |
| 631 | | | | | | | | |
| 632 | *Other Equipment* | 387 | 1989 | $11,433 | 1.711 | $19,566 | 0.689 | $ 13,479 |
| 633 | | 387 | 2004 | $18,823 | 1.439 | $27,092 | 0.962 | $ 26,058 |
| 634 | | 387 | 2005 | $29 | 1.021 | $30 | 0.983 | $ 29 |
| 635 | | | | **$30,285** | | **$46,688** | | **$ 39,565** |
| 636 | | | | | | | | |
| 637 | **General Plant** | | | | | | | |
| 638 | Structures and Improvements | 390 | 1988 | $5,311 | 1.749 | $9,289 | 0.674 | $ 6,258 |
| 639 | | 390 | 1997 | $7,970 | 1.365 | $10,883 | 0.823 | $ 8,958 |
| 640 | | 390 | 1998 | $16,486 | 1.339 | $22,082 | 0.842 | $ 18,584 |
| 641 | | 390 | 2003 | $1,118 | 1.132 | $1,266 | 0.941 | $ 1,191 |
| 642 | | | | **$30,885** | | **$43,519** | | **$ 34,991** |
| 643 | | | | | | | | |
| 644 | Office Furniture and Equipment | | | | | | | |
| 645 | *Electronic Equipment* | 391.1 | 1962 | $315 | 0.123 | $39 | 0.378 | $ 15 |
| 646 | | 391.1 | 1981 | $311 | 0.237 | $74 | 0.577 | $ 43 |
| 647 | | 391.1 | 1982 | $166 | 0.246 | $41 | 0.590 | $ 24 |
| 648 | | 391.1 | 1983 | $8,490 | 0.254 | $2,157 | 0.603 | $ 1,300 |
| 649 | | 391.1 | 1985 | $504 | 0.264 | $133 | 0.630 | $ 84 |
| 650 | | 391.1 | 1986 | $258 | 0.274 | $71 | 0.644 | $ 46 |
| 651 | | 391.1 | 1987 | $5,129 | 0.283 | $1,453 | 0.659 | $ 957 |
| 652 | | 391.1 | 1990 | $822 | 0.314 | $258 | 0.704 | $ 182 |
| 653 | | 391.1 | 1992 | $3,300 | 0.336 | $1,110 | 0.736 | $ 818 |
| 654 | | 391.1 | 1993 | $44,831 | 0.348 | $15,612 | 0.753 | $ 11,756 |
| 655 | | 391.1 | 1994 | $11,830 | 0.360 | $4,264 | 0.770 | $ 3,283 |
| 656 | | 391.1 | 1995 | $41,745 | 0.373 | $15,573 | 0.787 | $ 12,260 |
| 657 | | 391.1 | 1996 | $10,655 | 0.415 | $4,420 | 0.805 | $ 3,558 |
| 658 | | 391.1 | 1997 | $6,127 | 0.470 | $2,883 | 0.823 | $ 2,373 |
| 659 | | 391.1 | 2000 | $230,423 | 0.637 | $146,734 | 0.880 | $ 129,112 |
| 660 | | | | **$364,906** | | **$194,822** | | **$ 165,810** |
| 661 | | | | | | | | |
| 662 | *Furniture and Fixtures* | 391.2 | 1984 | $2,957 | 1.772 | $5,241 | 0.616 | $ 3,230 |
| 663 | | 391.2 | 1987 | $731 | 1.638 | $1,198 | 0.659 | $ 789 |
| 664 | | 391.2 | 1990 | $253 | 1.470 | $372 | 0.704 | $ 262 |
| 665 | | 391.2 | 1995 | $2,044 | 1.302 | $2,661 | 0.787 | $ 2,095 |
| 666 | | 391.2 | 1998 | $29,104 | 1.243 | $36,175 | 0.842 | $ 30,446 |
| 667 | | 391.2 | 2002 | $4,149 | 1.151 | $4,775 | 0.920 | $ 4,393 |
| 668 | | | | **$39,238** | | **$50,422** | | **$ 41,215** |
| 669 | | | | | | | | |
| 670 | Automobiles | 392.1 | 1995 | $53,046 | 1.191 | $63,183 | 0.787 | $ 49,741 |
| 671 | | 392.1 | 1998 | $20,985 | 1.137 | $23,864 | 0.842 | $ 20,084 |
| 672 | | 392.1 | 2000 | $14,288 | 1.097 | $15,675 | 0.880 | $ 13,792 |
| 673 | | 392.1 | 2001 | $16,959 | 1.071 | $18,169 | 0.900 | $ 16,347 |
| 674 | | 392.1 | 2004 | $174,061 | 1.023 | $178,029 | 0.962 | $ 171,230 |
| 675 | | 392.1 | 2005 | $27,403 | 1.007 | $27,590 | 0.983 | $ 27,134 |
| 676 | | | | **$306,742** | | **$326,510** | | **$ 298,328** |
| 677 | | | | | | | | |
| 678 | *Light Trucks and Vans* | 392.2 | 1990 | $1,734 | 1.264 | $2,191 | 0.704 | $ 1,544 |
| 679 | | 392.2 | 1991 | $39,383 | 1.221 | $48,091 | 0.720 | $ 34,636 |
| 680 | | 392.2 | 1993 | $18,153 | 1.167 | $21,179 | 0.753 | $ 15,948 |
| 681 | | 392.2 | 1994 | $43,095 | 1.142 | $49,234 | 0.770 | $ 37,907 |
| 682 | | 392.2 | 1995 | $167,833 | 1.120 | $187,895 | 0.787 | $ 147,922 |
| 683 | | 392.2 | 1996 | $64,009 | 1.099 | $70,327 | 0.805 | $ 56,612 |
| 684 | | 392.2 | 1997 | $153,483 | 1.081 | $165,872 | 0.823 | $ 136,527 |
| 685 | | 392.2 | 1998 | $108,566 | 1.069 | $116,043 | 0.842 | $ 97,662 |
| 686 | | 392.2 | 1999 | $303,158 | 1.054 | $319,414 | 0.861 | $ 274,869 |
| 687 | | 392.2 | 2000 | $49,432 | 1.031 | $50,972 | 0.880 | $ 44,851 |
| 688 | | 392.2 | 2001 | $47,682 | 1.007 | $48,016 | 0.900 | $ 43,200 |
| 689 | | 392.2 | 2002 | $42,873 | 0.990 | $42,432 | 0.920 | $ 39,035 |
| 690 | | 392.2 | 2003 | $4,695 | 0.970 | $4,554 | 0.941 | $ 4,284 |
| 691 | | 392.2 | 2004 | $210,822 | 0.978 | $206,147 | 0.962 | $ 198,274 |
| 692 | | 392.2 | 2005 | $98,245 | 0.988 | $97,044 | 0.983 | $ 95,438 |
| 693 | | 392.2 | 2006 | $218,212 | 1.000 | $218,268 | 0.997 | $ 217,662 |
| 694 | | | | **$1,571,375** | | **$1,647,680** | | **$ 1,446,372** |
| 695 | | | | | | | | |
| 696 | *Trailers* | 392.3 | 1971 | $105 | 2.939 | $309 | 0.462 | $ 142 |

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|---|---|---|---|---|---|---|---|---|---|
| 697 | | 392.3 | 1981 | $3,224 | 1.493 | $4,812 | 0.577 | $ | 2,774 |
| 698 | | 392.3 | 1982 | $3,211 | 1.461 | $4,691 | 0.590 | $ | 2,765 |
| 699 | | 392.3 | 1984 | $2,065 | 1.447 | $2,989 | 0.616 | $ | 1,842 |
| 700 | | 392.3 | 1988 | $4,082 | 1.386 | $5,659 | 0.674 | $ | 3,813 |
| 701 | | 392.3 | 1990 | $12,821 | 1.271 | $16,299 | 0.704 | $ | 11,481 |
| 702 | | 392.3 | 1994 | $11,371 | 1.166 | $13,257 | 0.770 | $ | 10,207 |
| 703 | | 392.3 | 1996 | $11,482 | 1.129 | $12,964 | 0.805 | $ | 10,435 |
| 704 | | 392.3 | 1997 | $9,105 | 1.125 | $10,239 | 0.823 | $ | 8,428 |
| 705 | | 392.3 | 1998 | $24,407 | 1.128 | $27,520 | 0.842 | $ | 23,161 |
| 706 | | 392.3 | 2001 | $10,721 | 1.104 | $11,839 | 0.900 | $ | 10,652 |
| 707 | | 392.3 | 2002 | $6,734 | 1.104 | $7,436 | 0.920 | $ | 6,841 |
| 708 | | 392.3 | 2003 | $11,036 | 1.094 | $12,071 | 0.941 | $ | 11,354 |
| 709 | | 392.3 | 2004 | $3,734 | 1.064 | $3,973 | 0.962 | $ | 3,821 |
| 710 | | | | **$ 114,098** | | **$ 134,058** | | **$** | **107,717** |
| 711 | | | | | | | | | |
| 712 | *Heavy Trucks* | 392.4 | 1987 | $16,054 | 1.582 | $25,391 | 0.659 | $ | 16,730 |
| 713 | | 392.4 | 1990 | $19,912 | 1.419 | $28,253 | 0.704 | $ | 19,900 |
| 714 | | 392.4 | 1991 | $144,663 | 1.371 | $198,322 | 0.720 | $ | 142,836 |
| 715 | | 392.4 | 1992 | $123,673 | 1.340 | $165,736 | 0.736 | $ | 122,053 |
| 716 | | 392.4 | 1993 | $206,210 | 1.310 | $270,105 | 0.753 | $ | 203,388 |
| 717 | | 392.4 | 1994 | $75,964 | 1.283 | $97,431 | 0.770 | $ | 75,016 |
| 718 | | 392.4 | 1995 | $142,001 | 1.257 | $178,478 | 0.787 | $ | 140,509 |
| 719 | | 392.4 | 1997 | $181,148 | 1.213 | $219,788 | 0.823 | $ | 180,904 |
| 720 | | 392.4 | 1998 | $32,144 | 1.200 | $38,573 | 0.842 | $ | 32,463 |
| 721 | | 392.4 | 2000 | $56,129 | 1.158 | $64,978 | 0.880 | $ | 57,175 |
| 722 | | 392.4 | 2001 | $189,329 | 1.131 | $214,044 | 0.900 | $ | 192,576 |
| 723 | | 392.4 | 2002 | $237,447 | 1.111 | $263,836 | 0.920 | $ | 242,715 |
| 724 | | 392.4 | 2003 | $49,446 | 1.089 | $53,847 | 0.941 | $ | 50,651 |
| 725 | | 392.4 | 2004 | $254,663 | 1.066 | $271,358 | 0.962 | $ | 260,995 |
| 726 | | 392.4 | 2005 | $74,854 | 1.023 | $76,613 | 0.983 | $ | 75,345 |
| 727 | | | | **$1,803,637** | | **$2,166,753** | | **$** | **2,028,691** |
| 728 | | | | | | | | | |
| 729 | Stores Equipment | 393 | 1995 | $3,679 | 1.209 | $4,446 | 0.787 | $ | 3,500 |
| 730 | | | | **$3,679** | | **$4,446** | | **$** | **3,500** |
| 731 | | | | | | | | | |
| 732 | Tools, Shop and Garage Equipment | 394 | 1957 | $1,816 | 5.341 | $9,700 | 0.338 | $ | 3,279 |
| 733 | | 394 | 1958 | $2,371 | 5.221 | $12,380 | 0.346 | $ | 4,279 |
| 734 | | 394 | 1959 | $1,814 | 5.158 | $9,356 | 0.353 | $ | 3,306 |
| 735 | | 394 | 1960 | $570 | 5.087 | $2,899 | 0.361 | $ | 1,048 |
| 736 | | 394 | 1961 | $6,569 | 5.030 | $33,043 | 0.369 | $ | 12,208 |
| 737 | | 394 | 1963 | $2,420 | 4.910 | $11,882 | 0.386 | $ | 4,590 |
| 738 | | 394 | 1966 | $2,261 | 4.618 | $10,442 | 0.413 | $ | 4,312 |
| 739 | | 394 | 1967 | $2,843 | 4.480 | $12,735 | 0.422 | $ | 5,377 |
| 740 | | 394 | 1968 | $2,442 | 4.296 | $10,491 | 0.432 | $ | 4,529 |
| 741 | | 394 | 1970 | $1,513 | 3.887 | $5,881 | 0.451 | $ | 2,655 |
| 742 | | 394 | 1971 | $2,650 | 3.702 | $9,810 | 0.462 | $ | 4,528 |
| 743 | | 394 | 1972 | $2,259 | 3.548 | $8,015 | 0.472 | $ | 3,782 |
| 744 | | 394 | 1973 | $19,753 | 3.361 | $66,381 | 0.483 | $ | 32,031 |
| 745 | | 394 | 1974 | $1,193 | 3.082 | $3,677 | 0.493 | $ | 1,814 |
| 746 | | 394 | 1975 | $2,587 | 2.816 | $7,286 | 0.504 | $ | 3,676 |
| 747 | | 394 | 1976 | $613 | 2.663 | $1,632 | 0.516 | $ | 842 |
| 748 | | 394 | 1977 | $3,974 | 2.504 | $9,949 | 0.527 | $ | 5,248 |
| 749 | | 394 | 1978 | $13,966 | 2.339 | $32,668 | 0.539 | $ | 17,618 |
| 750 | | 394 | 1979 | $8,973 | 2.160 | $19,383 | 0.551 | $ | 10,689 |
| 751 | | 394 | 1980 | $2,828 | 1.980 | $5,601 | 0.564 | $ | 3,158 |
| 752 | | 394 | 1981 | $6,954 | 1.810 | $12,590 | 0.577 | $ | 7,259 |
| 753 | | 394 | 1983 | $5,795 | 1.641 | $9,512 | 0.603 | $ | 5,734 |
| 754 | | 394 | 1984 | $12,623 | 1.582 | $19,970 | 0.616 | $ | 12,308 |
| 755 | | 394 | 1985 | $7,703 | 1.546 | $11,912 | 0.630 | $ | 7,507 |
| 756 | | 394 | 1986 | $1,628 | 1.504 | $2,448 | 0.644 | $ | 1,578 |
| 757 | | 394 | 1987 | $20,335 | 1.458 | $29,650 | 0.659 | $ | 19,536 |
| 758 | | 394 | 1988 | $797 | 1.405 | $1,120 | 0.674 | $ | 754 |
| 759 | | 394 | 1989 | $7,979 | 1.346 | $10,743 | 0.689 | $ | 7,400 |
| 760 | | 394 | 1990 | $31,637 | 1.301 | $41,159 | 0.704 | $ | 28,992 |
| 761 | | 394 | 1991 | $18,560 | 1.260 | $23,377 | 0.720 | $ | 16,837 |
| 762 | | 394 | 1992 | $20,906 | 1.232 | $25,758 | 0.736 | $ | 18,969 |
| 763 | | 394 | 1993 | $7,168 | 1.198 | $8,584 | 0.753 | $ | 6,464 |
| 764 | | 394 | 1994 | $36,144 | 1.179 | $42,608 | 0.770 | $ | 32,805 |
| 765 | | 394 | 1995 | $29,968 | 1.152 | $34,530 | 0.787 | $ | 27,184 |
| 766 | | 394 | 1996 | $3,400 | 1.126 | $3,828 | 0.805 | $ | 3,082 |
| 767 | | 394 | 1997 | $20,190 | 1.106 | $22,336 | 0.823 | $ | 18,385 |
| 768 | | 394 | 1998 | $14,313 | 1.088 | $15,573 | 0.842 | $ | 13,106 |
| 769 | | 394 | 1999 | $12,755 | 1.075 | $13,708 | 0.861 | $ | 11,796 |
| 770 | | 394 | 2000 | $268,495 | 1.064 | $285,648 | 0.880 | $ | 251,343 |
| 771 | | 394 | 2001 | $19,212 | 1.055 | $20,276 | 0.900 | $ | 18,242 |
| 772 | | 394 | 2002 | $22,248 | 1.057 | $23,527 | 0.920 | $ | 21,644 |
| 773 | | 394 | 2003 | $115,220 | 1.054 | $121,438 | 0.941 | $ | 114,230 |
| 774 | | 394 | 2004 | $51,928 | 1.034 | $53,693 | 0.962 | $ | 51,642 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 775 | | 394 | 2005 | $41,939 | 1.015 | $42,558 | 0.983 | $ | 41,853 |
| 776 | | 394 | 2006 | $5,372 | 1.001 | $5,377 | 0.997 | $ | 5,362 |
| 777 | | | | **$866,684** | | **$1,165,135** | | **$** | **872,980** |
| 778 | | | | | | | | | |
| 779 | Laboratory Equipment | 395 | 1984 | $3,474 | 1.891 | $6,569 | 0.616 | $ | 4,049 |
| 780 | | 395 | 1985 | $5,143 | 1.835 | $9,438 | 0.630 | $ | 5,948 |
| 781 | | 395 | 1987 | $37,877 | 1.748 | $66,202 | 0.659 | $ | 43,620 |
| 782 | | 395 | 1988 | $2,133 | 1.690 | $3,605 | 0.674 | $ | 2,429 |
| 783 | | 395 | 1989 | $7,171 | 1.629 | $11,678 | 0.689 | $ | 8,045 |
| 784 | | 395 | 1990 | $8,483 | 1.568 | $13,301 | 0.704 | $ | 9,369 |
| 785 | | 395 | 1991 | $4,498 | 1.515 | $6,814 | 0.720 | $ | 4,908 |
| 786 | | 395 | 1992 | $84,568 | 1.457 | $123,193 | 0.736 | $ | 90,722 |
| 787 | | 395 | 1994 | $35,221 | 1.369 | $48,202 | 0.770 | $ | 37,113 |
| 788 | | 395 | 1995 | $26,623 | 1.331 | $35,443 | 0.787 | $ | 27,903 |
| 789 | | 395 | 1996 | $90,401 | 1.300 | $117,560 | 0.805 | $ | 94,633 |
| 790 | | 395 | 1997 | $2,262 | 1.269 | $2,870 | 0.823 | $ | 2,362 |
| 791 | | 395 | 1999 | $31,917 | 1.213 | $38,714 | 0.861 | $ | 33,315 |
| 792 | | 395 | 2000 | $2,126 | 1.192 | $2,534 | 0.880 | $ | 2,230 |
| 793 | | 395 | 2003 | $3,083 | 1.103 | $3,402 | 0.941 | $ | 3,200 |
| 794 | | | | **$344,980** | | **$489,527** | | **$** | **369,846** |
| 795 | | | | | | | | | |
| 796 | Power Operated Equipment | 396 | 1979 | $4,227 | 2.497 | $10,556 | 0.551 | $ | 5,821 |
| 797 | | 396 | 1981 | $66,975 | 2.093 | $140,184 | 0.577 | $ | 80,822 |
| 798 | | 396 | 1983 | $27,515 | 1.898 | $52,214 | 0.603 | $ | 31,474 |
| 799 | | 396 | 1984 | $17,000 | 1.829 | $31,093 | 0.616 | $ | 19,164 |
| 800 | | 396 | 1987 | $15,588 | 1.721 | $26,821 | 0.659 | $ | 17,672 |
| 801 | | 396 | 1988 | $13,382 | 1.663 | $22,251 | 0.674 | $ | 14,991 |
| 802 | | 396 | 1989 | $17,882 | 1.589 | $28,415 | 0.689 | $ | 19,575 |
| 803 | | 396 | 1990 | $34,175 | 1.537 | $52,526 | 0.704 | $ | 36,998 |
| 804 | | 396 | 1991 | $36,367 | 1.492 | $54,254 | 0.720 | $ | 39,075 |
| 805 | | 396 | 1992 | $2,739 | 1.464 | $4,011 | 0.736 | $ | 2,954 |
| 806 | | 396 | 1993 | $2,260 | 1.428 | $3,227 | 0.753 | $ | 2,430 |
| 807 | | 396 | 1994 | $4,750 | 1.378 | $6,547 | 0.770 | $ | 5,041 |
| 808 | | 396 | 1995 | $44,207 | 1.333 | $58,932 | 0.787 | $ | 46,395 |
| 809 | | 396 | 1996 | $184,771 | 1.295 | $239,339 | 0.805 | $ | 192,662 |
| 810 | | 396 | 1997 | $136,669 | 1.269 | $173,468 | 0.823 | $ | 142,779 |
| 811 | | 396 | 1998 | $1,154 | 1.244 | $1,436 | 0.842 | $ | 1,208 |
| 812 | | 396 | 1999 | $137,169 | 1.212 | $166,257 | 0.861 | $ | 143,071 |
| 813 | | 396 | 2000 | $655,984 | 1.202 | $788,301 | 0.880 | $ | 693,631 |
| 814 | | 396 | 2001 | $72,639 | 1.180 | $85,714 | 0.900 | $ | 77,117 |
| 815 | | 396 | 2002 | $38,045 | 1.159 | $44,097 | 0.920 | $ | 40,566 |
| 816 | | 396 | 2003 | $41,541 | 1.144 | $47,516 | 0.941 | $ | 44,696 |
| 817 | | 396 | 2004 | $42,792 | 1.086 | $46,477 | 0.962 | $ | 44,702 |
| 818 | | 396 | 2005 | $20,794 | 1.028 | $21,378 | 0.983 | $ | 21,025 |
| 819 | | | | **$1,618,625** | | **$2,105,014** | | **$** | **1,723,868** |
| 820 | | | | | | | | | |
| 821 | Communication Equipment | 397 | 1989 | $2,550 | 0.908 | $2,316 | 0.689 | $ | 1,596 |
| 822 | | 397 | 1992 | $331 | 0.876 | $290 | 0.736 | $ | 214 |
| 823 | | 397 | 1993 | $2,353 | 0.860 | $2,024 | 0.753 | $ | 1,524 |
| 824 | | 397 | 1996 | $3,585 | 0.836 | $2,996 | 0.805 | $ | 2,412 |
| 825 | | 397 | 1997 | $4,052 | 0.831 | $3,366 | 0.823 | $ | 2,770 |
| 826 | | 397 | 1998 | $4,407 | 0.836 | $3,683 | 0.842 | $ | 3,099 |
| 827 | | 397 | 2000 | $122,820 | 0.870 | $106,911 | 0.880 | $ | 94,072 |
| 828 | | | | **$140,098** | | **$121,586** | | **$** | **105,686** |
| 829 | | | | | | | | | |
| 830 | Miscellaneous Equipment | 398 | 1984 | $19,727 | 1.637 | $32,299 | 0.616 | $ | 19,907 |
| 831 | | 398 | 1994 | $3,425 | 1.227 | $4,203 | 0.770 | $ | 3,236 |
| 832 | | 398 | 1995 | $1,347 | 1.203 | $1,620 | 0.787 | $ | 1,275 |
| 833 | | 398 | 1997 | $16,674 | 1.161 | $19,357 | 0.823 | $ | 15,933 |
| 834 | | 398 | 1998 | $25,678 | 1.148 | $29,484 | 0.842 | $ | 24,814 |
| 835 | | 398 | 1999 | $6,868 | 1.132 | $7,773 | 0.861 | $ | 6,689 |
| 836 | | 398 | 2000 | $63,028 | 1.108 | $69,816 | 0.880 | $ | 61,431 |
| 837 | | 398 | 2002 | $436 | 1.063 | $464 | 0.920 | $ | 426 |
| 838 | | | | **$137,183** | | **$165,016** | | **$** | **133,712** |
| 839 | | | | | | | | | |
| 840 | | | | | | | | | |
| 841 | | | | **$186,267,927** | | **$464,029,965** | | **$** | **280,410,318** |

**Vectren South**
**Evansville, Indiana**
**Gas-Electric Allocation- Common Plant**
**March 31, 2006**

| Acct. No. | Description | Original Cost Total | Original Cost Electric | Original Cost Gas | Current Cost Total | Current Cost Electric | Current Cost Gas | Current Cost w/ Technological Change Total | Current Cost w/ Technological Change Electric | Current Cost w/ Technological Change Gas |
|---|---|---|---|---|---|---|---|---|---|---|
| | Allocation | | 85% | 15% | | 85% | 15% | | 85% | 15% |
| | **Common Plant** | | | | | | | | | |
| 303 | Miscellaneous Intangible Plant | $ 61,758 | $ 52,494 | $ 9,264 | $ 64,352 | $ 54,699 | $ 9,653 | $ 60,532 | $ 51,452 | $ 9,080 |
| 389 | Land & Rights | $ 2,864,386 | $ 2,434,728 | $ 429,658 | $ 14,032,270 | $ 11,927,429 | $ 2,104,840 | $ 14,032,270 | $ 11,927,429 | $ 2,104,840 |
| 390 | Structures & Improvements | $ 31,347,995 | $ 26,645,796 | $ 4,702,199 | $ 52,751,888 | $ 44,839,104 | $ 7,912,783 | $ 27,668,822 | $ 23,518,498 | $ 4,150,323 |
| 391 | Office Furniture & Equipment | $ 5,183,767 | $ 4,406,202 | $ 777,565 | $ 6,394,397 | $ 5,435,237 | $ 959,160 | $ 925,319 | $ 786,522 | $ 138,798 |
| 392 | Transportation Equipment | $ 920,065 | $ 782,055 | $ 138,010 | $ 1,053,611 | $ 895,569 | $ 158,042 | $ 249,745 | $ 212,283 | $ 37,462 |
| 392 | Stores Equipment | $ 539,186 | $ 458,308 | $ 80,878 | $ 750,007 | $ 637,506 | $ 112,501 | $ 199,633 | $ 169,688 | $ 29,945 |
| 394 | Tools, Shop & Garage Equipment | $ 393,819 | $ 334,746 | $ 59,073 | $ 500,438 | $ 425,372 | $ 75,066 | $ 60,400 | $ 51,340 | $ 9,060 |
| 396 | Power Operated Equipment | $ 59,587 | $ 50,649 | $ 8,938 | $ 80,322 | $ 68,274 | $ 12,048 | $ 34,745 | $ 29,533 | $ 5,212 |
| 397 | Communication Equipment | $ 3,405,541 | $ 2,894,710 | $ 510,831 | $ 3,013,733 | $ 2,561,673 | $ 452,060 | $ 1,327,950 | $ 1,128,757 | $ 199,192 |
| 398 | Miscellaneous Equipment | $ 281,764 | $ 239,499 | $ 42,265 | $ 419,770 | $ 356,805 | $ 62,966 | $ 22,443 | $ 19,077 | $ 3,366 |
| | Total Common Plant | $ 45,057,868 | $ 38,299,188 | $ 6,758,680 | $ 79,060,787 | $ 67,201,669 | $ 11,859,118 | $ 44,581,858 | $ 37,894,579 | $ 6,687,279 |

Petitioner's Exhibit No. JPK-4
Vectren South-Gas
Page 1 of 1

**SOUTHERN INDIANA GAS AND ELECTRIC COMPANY**
**D/B/A VECTREN ENERGY DELIVERY OF INDIANA, INC.**
**(VECTREN SOUTH)**

**IURC CAUSE NO.** 43112

# DIRECT TESTIMONY

**OF**

**RONALD B. KEEPING**
**DIRECTOR OF ECONOMIC DEVELOPMENT AND MARKET RESEARCH**

**ON**

**ECONOMIC DEVELOPMENT RIDERS**

**AND**

**PRO FORMA ADJUSMENTS RELATED TO ECONOMIC DEVELOPMENT AND MARKET RESEARCH**

**SPONSORING PETITIONER'S EXHIBIT NO. RBK-1**

**Direct Testimony of Ronald B. Keeping**

**Q. Please state your name and business address.**

Ronald B. Keeping
One North Main St.
Evansville, IN 47702

**Q. What position do you hold with Petitioner Southern Indiana Gas And Electric Company d/b/a Vectren Energy Delivery of Indiana, Inc. (Vectren South or the "Company")?**

A. I am Director of Economic Development and Market Research.

**Q. What are your present duties and responsibilities as Director of Economic Development and Market Research?**

A. I am responsible for coordinating Vectren South's efforts in promoting the economic development of the Vectren service territory. I also supervise the Market Research function for Vectren.

**Q. Please describe your educational background.**

A. In 1973, I obtained a Bachelor of Arts degree in Economics from the University of Evansville. In 1978, I obtained a Master of Business Administration degree from the University of Evansville. I am a graduate of the Economic Development Institute program of the University of Oklahoma, and obtained the professional designation, Certified Economic Developer (CED) in 1996.

**Q. Please describe your professional experience.**

| | | |
|---|---|---|
| 1987-99 | Manager of Area and Industrial Development | SIGECO |
| 1999-2002 | Director of Economic Development | SIGECO / Vectren |
| 2002-2005 | Director of Industrial Development & Sales | Vectren |
| 2006 | Director of Econ. Dev. and Market Research | Vectren |

**Q. Have you previously testified before this Commission?**

A. No.

**Q. What is the purpose of your testimony in this Proceeding?**

A. My testimony will describe the role that Vectren South plays in promoting the economic growth of southwestern Indiana. I will then describe the Economic Development Rider and the Area Development Rider proposed by Vectren South in this proceeding, both of which are included in the proposed Tariff for Gas Service sponsored by Petitioner's Witness Scott E. Albertson. I will then describe how approval of these riders will allow Vectren South to play an even greater role in promoting job creation and retention. Finally, I will describe the pro forma adjustments related to Economic Development and Market Research.

**Q: You have testified that you are a Certified Economic Developer and the Director of Economic Development for Vectren South. What does economic development mean and what do economic developers do?**

A. In broad terms, "Economic Development" can be defined as the development of the economic wealth of a region for the well-being of its inhabitants. Economic development is a sustainable increase in living standards resulting in increased per capita income, better education and health. In more specific terms, as it is generally understood, "economic development" refers to a set of activities whose objective or result is the increase of employment and/or income in a region. Professional "economic developers" are responsible for planning and carrying out such job and income enhancement activities. These activities revolve around helping a community or region get prepared for economic growth, and then helping that community or region attract or retain employers whose payroll, local expenditures, and local tax payments will grow the economy. An economic developer works to create developable places to which such new or expanding employers may locate. In doing so, the economic developer must be conversant in the infrastructure needs of particular employers and the means by which such needs are met, and the regulatory requirements for doing so. An economic developer acts as a promoter for a community or region, advising prospective employers on a community's or region's particular assets. The economic developer acts as a facilitator during the period when an employer is locating to,

or expanding within, a community or region, and as such becomes an "ombudsman", cutting red tape and helping the employer overcome obstacles.

**Q. Please describe Vectren South's role in promoting economic development in southwestern Indiana.**

A. Vectren South promotes economic development in three essentially different ways. First, it assists the communities it serves to become better prepared to capitalize on economic development opportunities when they materialize. Second, it seeks to identify new economic development opportunities, both directly and in partnership with local, regional and state economic development entities. Finally, Vectren South partners with local, regional and state economic development entities in working with companies who are considering locating or expanding in our service territory, or who are at risk of leaving. One might refer to these processes as "product development" (or "community preparation"), "lead development", and "project management" (or "closing the deal"). In general, Vectren South acts as a partner with another entity in these efforts, lending financial and staff support to initiatives led by others. In some cases, however, Vectren South serves as the lead entity.

**Q. Please describe some examples of Vectren South's activities in these areas.**

A. In the area of "product development", Vectren South has played a major supporting role in the development of the Vanderburgh Industrial Park, the newest and most significant industrial park of its type in southwestern Indiana. The existence of this park has allowed the region to retain two employers, and attract four others. In the area of "lead development", Vectren South participates in a variety of marketing activities, such as call trips and advertising. In the area of "project management", the Company has worked with local and state entities to complete many of the major economic development projects that have occurred over the past 20 years in southwestern Indiana.

**Q. Please elaborate on Vectren South's activities insofar as project management in southwestern Indiana is concerned.**

A. Vectren South's economic development employees work with industrial and commercial entities that are interested in starting a business, finding a new location for their business or expanding their existing business. We work with those entities, the Indiana Economic Development Corporation, with state and local officials, and local economic development agencies to assist with the development of incentive packages and services that will meet the needs of and encourage those industrial and commercial customers to locate or expand in Indiana. Our economic development efforts not only require coordinating efforts with prospective businesses, economic development entities and state and local government but also require coordinating technical input and evaluation of Vectren South's engineering, operations, rates, and legal department. These very time consuming economic development efforts are very important to the financial well being of Indiana and her citizens. Vectren's economic development efforts have been helpful in many of Indiana's economic development successes. Significant economic development agreements in which Vectren South (or its predecessor) has played a major role include AK Steel, Azteca Milling, Toyota Motor Manufacturing, Waupaca Foundry, Graham Packaging and Curtis Marayasu. Significant retention agreements in which Vectren South (or its predecessor) has played a major role include Brake Supply and Pyrotek.

**Q. Please describe the benefits of economic development to Vectren South customers.**

A. The ultimate objectives any economic development activity are to foster the creation of greater employment opportunities for individuals, with the ultimate objective of increasing the average income of families, and the quality of life of the region. To the extent that the Company's economic development activities achieve these objectives in the southwestern Indiana region, Vectren South's customers will benefit, because in nearly all cases, the beneficiaries of the economic growth are southwestern Indiana residents, many of whom are Vectren South customers. A rule of thumb for manufacturing jobs is that $1 of compensation paid to an employee is leveraged ten times in the local economy as the wages are used to purchase goods and services, pay taxes, and are

reinvested in the community. Such growth also benefits Vectren South customers in other ways. Typically, the large industrial customers that Vectren South hopes to attract or retain in an area bear a larger tax burden, relative to the actual cost that they impose on local government, resulting in a lower tax burden for individuals and small commercial enterprises. By the same token, such large enterprises raise the overall assessed value of a community, making it possible for governments to invest in infrastructure and amenities that will improve an area's quality of life. Finally, large industrial customers help defray the capital cost of Vectren South's utility infrastructure. Their high load factors and the rates they pay helps Vectren South's ability to recover its costs, which will work to keep residential rates lower than they might otherwise be.

## ECONOMIC DEVELOPMENT RIDERS

**Q. How will Vectren South's proposed economic development riders assist in the promotion of economic development in the Company's service area?**

A. The Economic Development Rider ("Rider ED"), Sheet No. 45 in Vectren South's proposed Tariff for Gas Service, will be a tool that should increase the effectiveness of the "project management" ("closing the deal") element of the economic development process. The Area Development Rider ("Rider AD"), Sheet No. 46 in Vectren South's proposed Tariff for Gas Service, is intended to encourage consideration on the part of economic development prospects of areas, usually within a large city, where facilities already exist but are being underutilized. Development in such areas is both a social benefit, and a benefit to Vectren South's existing customers, who would otherwise be paying for the cost of maintaining such underutilized facilities.

**Q. Please describe the proposed Rider ED.**

A. Rider ED will be available to any customer who: (1) receives service under Vectren South Rates 145 or 160; (2) uses at least 5,000 dth per year; (3) has applied for and received economic assistance from a government entity; and (4) adds 25 new full time employees, or invests at least $1,000,000 in a new or

existing facility. The distribution charge for customers who qualify for Rider ED will be discounted by 50% for a period of 24 months. Rider ED is intended to be a "general purpose" rider. The requirement that the customer receive "economic assistance" from a government entity will allow this rider to become a feature of community or state-driven economic development attraction and incentive efforts, while at the same time preventing the application of the rider indiscriminately to non-economic development projects. The benefit associated with this rider is a 50% reduction of the distribution charge that Vectren South would otherwise charge the customer, for a period of 24 months.

**Q. Please describe the proposed Rider AD.**

A. Rider AD is intended to serve as an inducement to encourage a customer to make an investment in specific geographic areas of Vectren South's service territory. These areas, defined in Rider AD, are usually in a large city where utility facilities exist but are being underutilized. Customers meeting Rider AD's eligibility criteria will receive a discount on the distribution charge it would otherwise pay under Vectren South Rates 145 or 160. There are three different categories set out in Rider AD, pursuant to which a customer may qualify (described in greater detail hereafter). The benefits under Rider AD will continue for five years, as opposed to two years for Rider ED.

**Q. Please discuss the Urban Redevelopment category of the proposed Rider AD.**

A. A customer seeking the benefit of Rider AD under the Urban Redevelopment category would differ from a customer seeking the standard Rider ED described above, in the following ways: (1) the customer does not need to show that he has created additional jobs; (2) the customer does not need to show that he has received economic support from governmental agencies; (3) the customer must locate in a relatively large, unused industrial building. The benefit under Rider AD will be the same as for Rider ED. The intent here is to provide an incentive to re-occupy large unused industrial buildings, typically located in a city's historic core, and to do so with relatively little difficulty or paperwork. The fact that there

is both a minimum usage and minimum size threshold associated with this rider will assure that it will not be used indiscriminately.

**Q. Please discuss the Brownfield Redevelopment category of the proposed Rider AD.**

A. A customer seeking the benefit of Rider AD under the Brownfield Redevelopment category would differ from a customer seeking the standard Rider ED, described above, in the following ways: (1) the customer does not need to meet a minimum job creation or investment threshold; (2) the customer does not need to show that he has received economic support from governmental agencies (3) the customer must locate in a designated Brownfield area. The benefits under Rider AD will continue for five years, as opposed to two years for Rider ED.

**Q. Please discuss the Economic Development Zone category of the proposed Rider AD.**

A. A customer seeking the benefit of Rider AD under the Economic Development Zone category would differ from a customer seeking the standard Rider ED, described above, in the following ways: (1) the threshold for minimum job creation and investment will be lower under this rider than under Rider ED; (2) the Customer does not need to show receipt of economic support from governmental agencies; (3) the customer must locate in a designated economic development zone, of which there are several types cited in Rider AD. The intent here is to provide an incentive to smaller projects which might not be large enough to qualify for other incentives, but which are providing a benefit to the community simply by virtue of their decision to locate in one of the stipulated zones, which are, by definition and designation, areas where investment and job creation are particularly desirable.

**Q. Please elaborate on the purposes of the riders that you have just described.**

A. The standard Rider ED will probably be the most commonly used among the proposed economic development riders. I would envision it becoming part of incentive packages offered to major economic development prospects throughout the Vectren South service area. I would expect that it would improve our state and region's relative competitiveness for certain projects, especially those where natural gas is a material component of the prospect's cost structure. I anticipate that this rider might be applied for and used two or three times per year.

Rider AD, on the other hand, is a very focused rider. Looking at the three categories stipulated separately, I would observe the following:

The Urban Redevelopment category focuses on large, unused industrial buildings. Such buildings represent a significant potential resource for creating a large number of jobs, and are located in a city's core where there is frequently a need for jobs, but such buildings are typically burdened with problems that make their re-use problematic. The use of Rider AD under this category creates a small, but possibly important economic incentive that would encourage such buildings' redevelopment, and the consequent creation of jobs. I would expect that the use of Rider AD under this category would be applied for and used no more than once per year, and perhaps less frequently.

The Brownfield Redevelopment category is intended to incent development at specific sites whose redevelopment would represent a significant social benefit. Brownfield sites are sites whose use in the past has resulted in some level of environmental contamination that restricts their redevelopment. Such sites have been designated throughout the Vectren South service territory. The primary obstacle to the redevelopment of such is the environmental remediation costs. By offering a discounted gas rate to the ultimate user of such a site, we believe that Rider AD may effectively encourage the remediation and reuse of a Brownfield site. I would expect that the use of Rider AD under this category would be applied for and used no more than once per year.

The Economic Development Zone category is limited in applicability to geographic regions that have been pre-designated by governmental bodies as being areas where development, or re-development, would be particularly desirable. By lowering the threshold for qualifying projects, and eliminating the requirement that the customer must have received other economic incentives, we believe that this rider will incent development in such geographic areas in an efficient manner. (At this point in time, there are two zones in the Vectren South service territory that would qualify under this rider – the Evansville Urban Enterprise Zone and the Evansville Airport Development Zone.) I would expect that Rider AD under this category might be applied for and used once a year.

**Q. Are there benefits to having this portfolio of economic development rates standardized as part of Vectren South Gas' tariffs?**

A. Yes. This standardized portfolio of economic development riders will be part of Vectren South Gas' tariffs, which are publicly available on Vectren's website. Both Hoosier and out of state companies interested in new locations for facilities or expanding current facilities will be able to access these standardized economic development rates and incorporate projected savings into their initial financial decision making process. In that manner Vectren South Gas' economic development efforts will be effectively working to bring economic growth to Indiana 24/7.

## ECONOMIC DEVELOPMENT

**Q. Please describe how Vectren South's economic development work force is currently configured.**

A. Currently Vectren South's economic development personnel are part of the Economic Development and Marketing Research Department, which is overseen by a single Director. Reporting to that Director is one economic development employee. The Director and the single employee provide economic development services in all Vectren service areas, including that of Vectren South.

**Q. Is the current staffing of Vectren South's economic development function sufficient?**

A. No. We need additional resources. With additional personnel, we will be able to bring available benefits of economic development to our customers and to Indiana's economy

**Q. Why is Vectren South seeking to increase resources in this area at this time?**

A. Indiana has a traditional manufacturing driven economy. In the last few years, many of these types of companies have either downsized or moved operations overseas to find cheaper labor costs. Many US manufactures are struggling to compete in the global economy. As Indiana struggles to retain and replace such employers, the local utility has a natural role to play as a key service provider in terms of attracting new business growth. At this critical time for Indiana, Vectren believes that past successes, including the recent addition of Honda at Greensburg in the Vectren North service area, can be built upon and a small investment in this department could yield large returns for Indiana's Economic Development.

**Q. Does Vectren South have a proactive strategy for expanding its economic development efforts?**

A. Yes. We want to increase Vectren's economic development capabilities and increase our efforts to attract new business and to retain opportunities for customer expansion here in Indiana. Vectren South proposes to strengthen and more tightly unify our internal resources. We will work to further strengthen and develop new alliances in Indiana and elsewhere to help retain and attract new economic development opportunities. We will continually and critically re-evaluate what more the Company can do or what it can do differently to maximize Indiana's economic development potential. Vectren South will also develop a process to "prospect" for economic development opportunities inside and outside of Indiana. To continue and expand our efforts at economic development, Vectren South needs additional personnel.

**Q. What additional employee does Vectren South propose for its economic development department?**

A. Vectren South proposes to hire an Economic Development Representative. This position will increase Vectren South's capabilities in the recruitment of large industrial and commercial customers. The position duties will include:

- Identifying prospective industrial and commercial customers;
- Interfacing with and assisting local, regional, and state economic development agencies in our service territory to help recruit new employers;
- Building new strategic alliances;
- Maximizing the use of all strategic alliances
- Managing the recruitment process for prospective industrial and commercial customers;
- Help refine and exercise a process to "prospect" for economic development opportunities inside and outside of Indiana rather than waiting for the opportunity to come to us.

**Q. Is this new position essential to Vectren South's economic development efforts?**

A. Yes. The level of work to be done and the time commitment required mandates the additional employee in economic development.

**Q. What is the annual cost of this new economic development position?**

A. The annual cost allocated to Vectren South (gas) will be $7,408. This amount is included in Adjustment A15 as shown on Petitioner's Exhibit No. MSH-2.

## MARKET RESEARCH AND MARKETING SUPPORT

**Q. Please describe how Vectren South's market research and marketing support work force is currently configured.**

A. Currently Vectren South's market research activity is overseen by a single Director. Reporting to that Director is one market research employee. The

Director and the single employee provide market research services in all Vectren service areas, including that of Vectren South. The Marketing Support Department is separate from this department and currently consists of only one employee.

**Q. Is the current staffing of Vectren South's market research, and marketing support functions sufficient?**

A. No. We need additional resources. With additional personnel, these departments will be able to bring available benefits of market research, and marketing to our customers and to Indiana's economy

**Q. Please describe Vectren South's market research and marketing efforts.**

A. One of the primary objectives of our marketing research area is customer satisfaction measurement. Market research provides Vectren with the information and performance metrics to determine if customers are satisfied with the services they receive and how those services can be further improved to enhance overall customer satisfaction. Vectren South continually strives to satisfy the needs and meet the expectations of our customers. In order to do this we must better understand our customers' specific needs and their perception of the energy market.

The baseline data from our market research effort also drives our marketing support activities that lead to determining which new products and services customers may want.

Another important objective of market research and marketing support activities is customer growth and retention. Spreading our fixed costs over a larger customer base places downward pressure on rates. Conversely, loss of customers or reduced growth places increased pressure on customer rates. Increasing customer satisfaction, increasing customer convenience, and providing the appropriate services for customers to feel that they receive reasonable value for their utility expense are key to maintaining customers.

**Q. Are additional personnel needed for Vectren South Market Research and Marketing Support departments?**

A. Yes. The Marketing Support area has a current vacancy for a Director position and the Marketing Research Department has a vacancy for a Manager position. We propose to hire a Marketing Support Department Director that would oversee both the market research and market support areas. The market research manager would manage the daily activities of the research functions. These personnel are needed to reasonably perform the market research and marketing support functions to manage the activities. This will also allow the bifurcation of the current single economic development and market research organization and thereby allow greater focus and effort to be placed on our economic development activities.

**Q. What is the total cost proposed by Vectren South for the headcount additions discussed above?**

A. The total cost of the headcount additions described above, as allocated to Vectren South (gas) is $33,294 as shown in Petitioner's Exhibit No. MSH-2 Adjustment A15.

**Q. Will Vectren South hire a Marketing Research Consultant?**

A. Yes. We will hire a market research consultant or consultants to help interpret market research data and help develop programs that are suggested by that research data. The research consultants' role will be to go beyond and augment the Market Research Department's efforts. There will be an ongoing need to retain the services of such consultants. We plan to continuously improve our ability to understand our customers' needs and therefore expect that we will need to retain such expertise on an ongoing basis.

**Q. Does the test year reflect the cost of Market Research customer surveys?**

A. No. Vectren has recently contracted for new market research studies and will contract for additional studies in the future. Vectren South will annually deploy a market research customer survey to gather information on how we can better

meet the needs of our customers while keeping our rates low. This survey will gather customer information on demographics, customer needs, most critical areas of utility service to customers, conservation strategies, how price affects perception of the competitiveness of gas energy, market share, and customer growth. The survey results will be critical in determining how Vectren South can satisfy its customers' needs, retain customers, and provide good value for their utility expense.

**Q. Does the test year reflect the cost of new customer satisfaction surveys?**

A. No. A new type of survey has been implemented in 2006 for benchmarking Vectren's performance in comparison to five (5) other peer utilities and expensed after the end of the test year. This expense is incurred to pay external research firms to conduct customer satisfaction surveys, process the information/data and report the findings. These surveys will recur annually and are critical in assessing Vectren's customer satisfaction performance with other similar utility service operations.

**Q. Are these market research surveys necessary?**

A. Yes. They are needed to determine how our customers view the service performance and many aspects of our operations. They allow us to understand our customers' needs and provide direction on what we can do and offer to change and improve processes, develop new services and increase customer satisfaction. For example, there may be billing products we can offer or even service options such as renewable energy alternatives or efficiency programs where customer feedback would be helpful in order to design and propose programs that increase customer satisfaction and deliver good customer value.

**Q. What is the total annual cost to Vectren South (gas) for the economic development, market research, and marketing activities you have described?**

A. The total annual cost allocated to Vectren South (gas) is $71,735 as shown in Petitioner's Exhibit No. MSH-2 Adjustment A23.

**Q. Does this conclude your prepared testimony?**

**A.** Yes, it does.